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## **Bilateral Collaborations in Sino-foreign Eco-cities:**

Lessons for Sino-Dutch Collaboration in  
Shenzhen International Low-carbon Town

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## **Executive summary**

The increasing concerns about global climate change and rising environmental pressures have prompted countries and cities to explore new sustainable development pattern. The concept of eco-city has been proposed as a potential sustainable urban solution. China as the most populous country in the world, is especially challenged by its rapid urbanization and environmental degradation, and has launched a number of eco-city initiatives in recent years. Among them many are eye-catching bilateral collaboration projects with the engagement of international partners. The growing trend of Sino-foreign eco-city initiatives give rise to the main research question of this study: “What is the role of bilateral collaborations in Chinese eco-city development?”

This question is further divided into three sub-questions, among which the first sub-question intends to categorize previous Sino-foreign eco-city collaborations based on distinct features observed through an investigation on eight previous Sino-foreign eco-cities. The second sub-question focuses on the critical success factors influencing bilateral collaborations in Sino-foreign eco-cities at political/institutional, organizational, and individual levels. Finally based on the lesson drawings from previous experience, the study intends to answer the question of what a viable Sino-Dutch collaboration alternative could look like in Shenzhen International Low-carbon Town.

Qualitative research methods including case study and comparison are used in the study. Case studies on eight selected Sino-foreign eco-cities present detailed empirical information and analysis systematically. Following the case studies, three types of bilateral collaborations in previous Sino-foreign eco-city projects were concluded: client-provider/designer type collaboration, intergovernmental agreement based collaboration, and JV-based collaboration under joint supervisory board. Based on the case studies, a framework of success factors influencing bilateral collaborations in Sino-foreign eco-cities is also established. With the lesson drawings from previous experience and specific analysis for Shenzhen International Low-carbon Town, two potentially viable Sino-Dutch collaboration alternatives including the cultivating and sufficing collaborations are proposed. Finally, some general findings across the cases are discussed and summarized in the paper.

This study intends to fill in the literature gap in international bilateral collaborations in eco-city development by focusing on China’s experience. Besides, it also can contribute to the academic and professional community by making an inventory of existing Sino-foreign eco-city projects. The empirics and findings in this study can also shed light on the design of future bilateral collaborations in Chinese eco-city development with proper adaptations.

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# 1. Introduction

The past two decades have witnessed continuous economic growth in China, marked by an average annual gross domestic product (GDP) growth rate of above 10%(National Bureau of Statistics 2011). Meanwhile, the country experienced unprecedentedly rapid urbanization. It is estimated that 150 million to 200 million people have moved from the countryside to the cities since 1978, with a majority being occupied in energy intensive activities(Hefa 2009). Along with the mass rural-to-urban migration, more and more challenges in urban development are brought to attention. Multifaceted problems including air and water pollution, water shortages, and massive energy demands, coupled with the challenge of global climate change has forced China to actively explore novel ways to expand urban areas while conserving natural resources. Against such background, eco-city, first proposed as an eco-friendly city “enabling its residents to live a good quality of life while using minimal natural resources” by Richard Register, has evolved into an integrated urban solution including dimensions of sustainable development, community economic development, appropriate technology, green cities/communities, bioregionalism and native world view, etc(Roseland 1997). As the concept of eco-city become more comprehensive covering social, economic, natural, regional and cultural aspects, it attracted the attention of a wide variety of social groups ranging from government officials, urban planners and architects, to environmentalists and entrepreneurs all over the world. During years of development, the study of eco-city has shifted from theoretical research to actual practices in urban planning, re-localization of economies and integrated building programs. Since sustainability of natural environment, continuous urbanization and global climate change are becoming the increasing concerns in the 21<sup>st</sup> century, eco-city has come to be known as a solution to the dilemma of preserving natural environment and resources and creating urban living capacity at the same time.

In response, quite a few cities and government bodies across the world have started the exploration for eco-cities. China, as the world’s most populous country, is especially challenged by sustainability issues in traditional urbanization and consequently actively initiated experimental eco-city projects in a national scale. Noticeably, in many of these high-profile projects international partners are engaged to jointly develop a tailor-made eco-city based on the local conditions. This research provides an overview of eight existing Sino-foreign eco-city initiatives and focuses on the bilateral collaborations between participating parties. The anatomy into cooperative organizational structures and identification of key success factors across the cases enables a categorization of bilateral collaboration patterns in Sino-foreign eco-cities. Furthermore, based on the lesson drawings from previous Sino-foreign eco-city

collaboration practice and a stakeholder analysis for the Sino-Dutch Shenzhen Low Carbon City under study, potential suitable collaboration alternatives for the particular project will be proposed and discussed.

### **1.1. The emergence of Sino-foreign eco-cities**

Recently, Shenzhen has added a low-carbon city in Pingdi Town, Longgang District on its development agenda. Shenzhen Municipal government and Longgang District government invited a Sino-Dutch team consisting of academic parties including the Harbin Institute of Technology Shenzhen Graduate School, the Next Generation Infrastructures Foundation (closely related to Delft University of Technology), and the a Dutch architecture institute Dynamic City Foundation, to write a spatial master-plan for the Pingdi low-carbon city. With joint efforts, the project has received national leaders' attention and supports on both sides, and was elevated to be a an International Low-carbon Town project with the Sino-Dutch collaboration as an important component. In order to further drive the process and facilitate the cooperation and exchange between both sides, a suitable organizational arrangement for the collaboration needs to be established. That brings in the research question of this study, namely what a viable Sino-Dutch collaboration alternative satisfying the wishes and conditions on both sides in Shenzhen International Low-carbon Town should look like, and what experience can be learnt from the bilateral cooperation in previous Sino-foreign eco-city initiatives.

During the past few years, a number of Sino-foreign eco-cities have been launched across different parts of China. Among them there are once high-profiled Dongtan Eco-city, most promising Sino-Singapore Tianjin Eco-city in many's eyes, and the Sino-Finnish Mentougou Eco-valley which claims to be the world's largest eco-city upon completion. These projects have spearheaded in including international partners in Chinese eco-city development, and accumulated valuable experience in bilateral collaboration in eco-city planning and implementation. In order to boost the Sino-Dutch collaboration in Shenzhen International Low-carbon Town and build up a supportive cooperation platform, it is essential to look into previous Sino-foreign eco-city initiatives and draw on their experience and lessons in bilateral collaboration practices. Except for the empirical relevance in the Sino-Dutch collaboration alternative design for the development of Shenzhen International Low-carbon Town, there is also scientific relevance in the study of the investigation on the contextual background, motivations and dynamics shaping the bilateral cooperation in Sino-foreign eco-cities. The study aims to derive a deeper understanding of the role bilateral collaboration plays in Chinese eco-city development and discuss the positive and negative experience in previous practice.

Based on these findings, lessons can be learnt for the Sino-Dutch collaboration in Shenzhen International Low-carbon Town as to how to better align the interests and expectations of participating parties and develop a stable collaboration mechanism.

## 1.2. Research objective and research questions

### 1.2.1. Research objective

This research study bears two main purposes. Firstly by looking into the organizational arrangements of former Sino-foreign eco-city initiatives, the study aims to investigate the essential characteristics of different collaborative organizational arrangements in previous bilateral eco-city practice and generalize distinguished types of bilateral collaborations and their effectiveness in supporting Sino-foreign eco-city development. Discussions are made as to how these types of collaboration models work out within different specific contexts and what factors have affected the collaborations during the course. Secondly, based on these lesson drawings, the research will explore the suitable organizational arrangements for the Sino-Dutch collaboration in Shenzhen International Low-Carbon Town in Pingdi. More specifically, by mapping out the contextual information of the Shenzhen International Low-carbon Town and drawn on suitable experience of previous bilateral collaborations, the study strives to conceive a tailor-made collaboration alternative for the Sino-Dutch collaboration in this particular project.

### 1.2.2. Research questions

Based upon the research objective stated above, the main research question can be formulated as:

***What is the role of bilateral collaboration in Sino-foreign eco-city development?***

Arising from the main research question, three sub-questions can be derived in the research framework progressively. These supporting questions will help to systematically approach the main research question:

- What types of bilateral collaborations have been adopted in previous Sino-foreign eco-cities, and how did they work out?
- 1) What are the characteristics of different types of bilateral collaboration models in previous Sino-foreign eco-cities?
  - 2) How did different types of bilateral collaboration models work out?

- What are the factors influencing bilateral collaborations in Sino-foreign eco-cities?
- What should a suitable Sino-Dutch collaboration in Shenzhen International Low-carbon Town look like?

### 1.3. Research methods

This research will be conducted based on qualitative research methods. The first step would be a thorough literature review on the important concepts involved in eco-city planning and the institutional transplantation theory which guides the lesson drawings in this study. Then case studies based on desk research will be carried out to collect detailed information on previous Sino-foreign eco-city initiatives with a particular focus on the organizational arrangements adopted and its impact on the further development of the project. This will be followed by a categorization and comparisons of the bilateral collaborations based on different features observed across the cases. Lessons will be drawn from the previous experience with reference to the contingencies for the Sino-Dutch collaboration in Shenzhen International Low-carbon Town. Based on these findings and the stakeholder analysis for Shenzhen International Low-carbon city on both Dutch and Chinese sides, viable collaboration alternatives for the Sino-Dutch collaboration in Shenzhen International Low-carbon Town will be proposed.

#### 1.3.1. Case study

In order to look at different organizational arrangements used in previous Sino-foreign eco-city projects, the dynamics shaping each structure and explore a framework of factors influencing bilateral collaboration in Chinese eco-city development, case studies are used in this study. The explorative nature of the study and the absence of database on Sino-foreign eco-city initiatives made case studies a most appropriate research method in this study. In this study eight previous Sino-foreign collaboration projects are selected in the case study. They are organized in the same sequence in the following chapters as is shown in Table.1 below. Due to the sample size, case studies are conducted based on desk research and document review. First a literature review on the core concepts in eco-city development will be conducted; then relevant collaboration concepts and the institutional transplantation theory is reviewed to develop the theoretical framework for the following case studies. By examining through the previous practices, divergence on different aspects of bilateral collaboration arrangements will emerge and their relevant indications for the Sino-Dutch collaboration in Shenzhen

International Low-carbon Town will be discussed using the theoretical framework. The lesson drawings and comparisons with previous Sino-foreign eco-cities will shed light on the design of viable Sino-Dutch collaboration alternatives within the specific context.

### 1.3.2. Comparison

Since one of the purposes in this study is to understand the similarities and differences between the organizational structures in bilateral collaborations in Sino-foreign eco-cities, comparison is used to map out different characteristics of identified types of collaboration models on different dimensions. By examining the collaboration models in previous Sino-foreign eco-city projects and comparing the particular purposes they serve and potential missing parts across cases, relevant lessons can be drawn in bilateral collaboration arrangements design in Sino-foreign eco-city projects based on the contingencies.

Table. 1 Selected Sino-foreign collaboration projects

Chapter	Case
Chapter3	Suzhou Industrial Park
	Sino-Singapore Tianjin Eco-city
	Sino-Singapore Guangzhou Knowledge City
Chapter4	Caofeidian International Eco-city
	Wuxi Sino-Swedish Eco-city
Chapter5	Qingdao Sino-German Eco-park
Chapter6	Sino-Finnish Mentougou Eo-valley
Chapter7	Dongtan Eo-city

## 1.4. Relevance

### 1.4.1. Scientific relevance

The research intends to delve into the factors affecting bilateral collaboration on Sino-foreign eco-city initiatives with a focus on organizational arrangements between China and foreign partners. The study will enrich the current body of scientific knowledge on the organizational structure for the planning of eco-city initiatives with international engagement.

Much of the literature is dedicated to various aspects that are essential to the construction of an eco-city, from a comprehensive elucidation of urban sustainability to case studies on worldwide practices towards eco-cities with different set of goals. Nonetheless, seldom do these studies focus on the organizational structures for bilateral cooperation between international partners. By taking a closer look into the collaboration models between Chinese and foreign partners in eco-city development, the study aims to identify different types of collaboration models and their performance in supporting bilateral cooperation. The discussion of goals and resources of collaborating parties and the dynamics during the process that eventually shape up the organizational arrangement helps to gain a deeper understanding of particular purposes these collaboration models serve. In addition detailed analysis on each case enables the identification of critical success factors which contribute to the development of a framework of factors influencing bilateral collaborations in eco-city planning and implementation. The research attempts to fill in the gap in existing literature about the role bilateral collaboration plays in Chinese eco-city development and the design of a supportive collaboration mechanism with international engagement in the specific context of an eco-city initiative.

#### **1.4.2. Empirical relevance**

The examination on bilateral collaborations in existing Sino-foreign eco-cities first creates an inventory of collaboration models adopted by Chinese and international partners in different projects. The lesson drawings from case studies offer valuable experience for future collaborations on eco-city development projects. Moreover, the paper attempts to map out the critical success factors in previous Sino-foreign eco-city projects. Based on these findings and a comprehensive stakeholder analysis on Shenzhen International Low-carbon Town project on both Dutch and Chinese sides, suitable collaboration alternatives will be proposed to engage the collaborating parties and support their collective design and decision makings. With an organizational arrangement in place, more intensive participation and more concerted efforts will be encouraged and steered towards the shared vision of low-carbon city development.



## 2. Theoretical framework

### 2.1. Eco-city concepts

#### 2.1.1. Definitions of an eco-city

The concept of ecological city originates in the 1980s and was described as an environmentally, socially and economically responsible city by some German scholars(Kunz 2006). Later the term “eco-city” was first coined by Richard Register in his book *Eco-city Berkeley: Building Cities for a Healthy Future* in 1987. As one of the world’s greatest theorists and authors in ecological design and city planning, Register’s describes an eco-city to be a self-reliant city that minimizes demands on resources like energy, water with reduced waste pollution. An eco-city is designed to reduce the ecological footprint of a city while taking the environmental impact into consideration. Since then, the understanding of eco-cities has been evolving over time. It is now widely recognized that what constitute the essence of an eco-city are not only the ecological requirements, but also the socio-economic conditions and the attitudes of the inhabitants. However, so far there has been no universally accepted standard definition of an eco-city. Among the various definitions, a more comprehensive one given by Urban Ecology Australia prescribes some key features of an eco-city: buildings make best use of sun while having multi-stories to maximize the land available for green space; the majority of residents live within walking or cycling distance to minimize cost and energy used for transportation; industrial processes involve reuse of by –products and minimize the movement of goods, etc. In general, the concept of eco-city is closely aligned with sustainable development which applies the integration of ecological and resources management principles into the urban planning decision making process(Urban Ecology Australia 2007). In a sense, the eco-city concept offers more guidance than practical direction about how to process in a specific context or situation.

Though no standard definition of an eco-city is available, it is clear that the ultimate goal of an eco-city and sustainable city is to improve the urban condition and create livable cities. However, problems often arise in priority management when it comes to eco-city development. Different actors involved prioritize different dimensions such as economic, social or environmental aspects. It has been observed in many pioneering eco-city development projects around the world that environmental imperative constantly struggles with economic demands, social needs and institutional interests, which stem from divergent values, objectives and the policies of the actors involved during the planning process(Kunz 2006). Except for these tensions between various stakeholders, how to address local customs, local needs and

practical knowledge within a particular area remains a crucial challenge. This relates to the danger Scott had pointed out when not accommodating local-tacit knowledge to the planning of the eco-city (Scott 1998). Cities are different, and hence the criteria used and standards set should be localized in accordance with financial and technological capabilities that are affordable for a particular city. Furthermore, the financial viability of the projects, technological requirements, capacity for future maintenance of the city, and availability of a tailor-made regulatory and administrative framework are all important considerations in eco-city development initiatives.

### **2.1.2. Types of eco-cities**

Three types of eco-city development are distinguished in a paper by Simon Joss, namely new development, expansion of existing area, and 'retro-fit' development (Joss 2009). An eco-city built from scratch is the new development type. When an eco-city development originates from the expansion of new district or neighboring area, it belongs to the second category of expansion of existing area. 'Retro-fit' development relates to sustainable adaptation or redevelopment within existing urban infrastructure. Based on the survey on 79 eco-city initiatives across the world, Simon points out that though the new development eco-cities usually attract more attention, it is the expansion of existing area and 'retro-fit' development that take up the majority of eco-cities. An important indication of different development types relates to distinct approaches to eco-city innovation. For example, in 'retro-fit' development more focus is on the preservation and renovation of historical buildings and sites, which require different planning and technological solutions than those in new eco-city development or expansion of existing area.

### **2.1.3. Driving factors of eco-cities**

Eco-cities are generally considered as a solution to creating urban living capacity and reducing the negative impact on environment and natural resources. In addition, the innovative nature of eco-cities also brings opportunities in upgrading local economic structure and establishing a stronger local identity. Simon Joss has prescribed six driving factors for eco-city development, namely environmental challenges, socio-economic pressures, business development, cultural branding, political leadership and international co-operation (Joss 2011).

Among the six factors, environmental challenge can be readily perceived as the most important and direct driving factors of eco-cities. By name, eco-cities are designed to respond to environmental problems such as air pollution, water shortage or waste reduction. Simon argues that socio-economic pressure caused by rapid urbanization and growing population is

the second key driving factor of eco-cities around the world. While many developing countries are initiating eco-cities to tackle the rising demand for urban services, some developed countries also build eco-cities to increase housing stock based on the prediction of population growth. In 'retro-fit' eco-city development, the pursuit of economic restructuring towards knowledge intensive industries such as green technology and creative industries is another socio-economic motivation. Eco-cities emerged as a solution not only to sustainable urban development, but also to also to revitalize urban areas socio-economically by switching from old industries to new knowledge and green technology based industries.

Eco-city initiatives also bring buoyant opportunities for technological innovation and business development. Companies engaged in urban planning, architecture and green technology are actively invited to make a contribution to eco-city projects and exhibit the efficacy of their expertise. Eco-city projects emphasize the adoption of innovative technologies, thus promote businesses with a sustainability theme. Public-private partnerships have been adopted in many projects and the role of private sector underlines the business development that is aligned with the promotion of technological innovation.

Moreover, as eco-cities projects are highly city-based, the innovative and modern features give cities strong identity and competitiveness. The branding effect can also be perceived as invisible benefits for individual cities. As leadership plays a key role in translating an eco-city vision into a viable plan and the eventual implementation, eco-city initiatives are usually signature projects of local officials who act as the advocates of sustainable urban development. The national policy from central government may also give local authorities a push to embark on eco-city projects.

Finally, due to the global nature of environmental challenges and socio-economic pressure, the involvement of international partners in eco-city projects is also observed in worldwide eco-cities. International networking facilitates the knowledge transfer and joint business development, which resonate with the era of globalization. The highly international cooperation in eco-city development also relates to the topic of this research of bilateral collaboration in eco-city development within the Chinese context and will be studied in detail in the following parts of the paper.

## **2.2. Bilateral collaborations in Chinese eco-cities**

### **2.2.1. Drivers for collaboration**

When collective decision makings as urban planning take place in a network of stakeholders, policy entrepreneurs will attempt to drive the process towards directions that benefit themselves and the interests they represent. And the success of such efforts, as is pointed out by DiGaetano and Strom, lies in the political actors' ability to "forge alliances with other actors to draw on broader ranges of political resources to accomplish governing tasks".

O'Flynn and Wanna have categorized drivers of collaboration into three groups: external drivers, internal drivers and volition factors associated with the roles and responsibilities of government(O'Flynn and Wanna 2008). External drivers refer to the pressure brought by globalization and increasing technological sophistication. Closer international linkages have given rise to the development of world markets, expanding global trade. In addition, facing increasingly severe global environmental and resource pressures, governments start to resort to international dialogue and seeking for collective actions.

Internal drivers are defined as demand for more effective policy to meet the growing internal needs. It relates to the capacity issues of government agencies and the required skill base of the public sector. Political officials are requested to be more responsive to community needs, and their usually limited resources and capacity make collaboration an imperative in modern management.

Finally collaboration can also be prompted by volition factors aiming to develop shared understandings and goals of problem among the public. It includes consensus building and alliance development for particular actions to a problem as a political strategy. By garnering more support and wider consensus, governments can develop new policy agenda and strengthen their administrative capacity to better accommodate the changing circumstances. Collaboration enables them to improve their performances by offering integrated service to the public.

### **2.2.2. Collaboration continuum**

According to Barbara Gray, collaboration is a "process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible"(Gray 1989). Arising from this definition, many scholars have developed broader elucidation on the concept of

collaboration. Mandell and Steelman have observed the differences in relative stability, degree of interdependence and number of organizations involved in various collaborations and then distinguished five types of collaborations ranging from intermittent coordination to network structures (Mandell and Steelman 2003). This description resonates with the concept of collaboration as a “continuum of partnerships” proposed by Beverly Cigler (Cigler 1999). In Cigler’s opinion, collaborative arrangements vary in complexity, purpose, intensity of linkages and formality of agreements, constituting a continuum of partnerships. At one end of the continuum is the loosely organized “networking” partnership primarily for simple information sharing. With the increase in complexity, cooperative, coordinating and collaborative partnerships are identified respectively for resource exchange and problem solving. Cigler points out that among the four types of partnership, collaborative efforts usually involve strong, long-term and formal linkages, as well as considerable commitment of resources. The proposed collaboration continuum is shown in Fig.1 below.

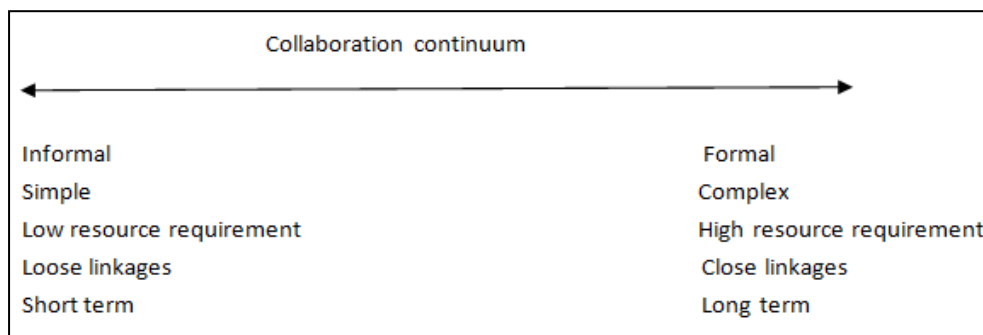


Fig. 1 Collaboration continuum varying on different dimensions

### 2.2.3. Opportunities and potential pitfalls in collaboration

O'Flynn and Wanna pointed out that while there can be many benefits and advantages in collaboration, it should also be noted that certain pitfalls may result in negative experience in collaborative activities (O'Flynn and Wanna 2008). As for the opportunities, collaboration first can help policymakers to discern and target problems. In order to formulate effective measures, they need a clear vision of the situation and broader perspectives. Furthermore, through collaboration policymakers can garner support around them and gain public acceptance on the relevant decisions made. With the assistance from collaboration partners, governments are also able to step up and take the initiative in testing new ideas for public issues. For non-government parties, collaboration would offer them the chance to learn the operations of government while exerting their influence in policy decisions.

Collaboration also opens the space for mutual learning and shared knowledge development. Collaborating parties are engaged in close interactions with each other and can draw on other's knowledge and experience that are previously outside their organizations. Except for the learning opportunities, relationship development and trust building can also be regarded as valued benefits for those involved.

In terms of implementation, collaboration enables parties to integrate their relevant resources and capabilities into more effective deliverables. More players have the chance to get involved in the policy process and jointly develop solutions with their specialized skills and expertise.

Nonetheless, there are also some risks in collaboration that should be recognized and properly addressed. Additional complexity caused by collaboration may make it difficult to ensure political buy-in. With the involvement of multiple parties, government authorities may be reluctant to extend their political accountabilities when they consider the outcomes are beyond their control. Blurred accountability among collaborating parties could be a major problem. Without clear organizational arrangements illustrating which parties are responsible for certain decisions, it would be difficult for those involved to know what to expect and thus may drag the collaboration into chaos. The situation can get worse when difficulties begin to surface and no appropriate response could be made in a timely manner, eventually leading the collaboration to go awry.

Another difficulty in collaboration is the time it takes to arrive at a collective decision. Lengthy discussions and negotiations without substantive progress can delay the initiatives and cause frustration among collaborating parties. How to drive the process effectively and maintain sustained momentum is a crucial challenge in collaboration.

The identified opportunities and pitfalls above can offer guidance on the discussion of strengths and weakness of different collaboration designs and will be applied in the comparison of proposed Sino-Dutch collaboration alternatives in Shenzhen International Low-carbon Town in this study.

#### **2.2.4. The context of eco-city development in China**

The emergence of eco-cities in China should be understood in a broader urban development and governance context. Here the urban governance interaction model proposed by Digaetano and Strom can provide an analytical framework to understand and explain the complex phenomena and dynamics for the eco-city movement in China.

According to DiGaetano and Strom, a comprehensive and robust investigation of urban governance issues should be approached at three interrelated levels of analyses on the structural context, the political culture, and the political actors (DiGaetano and Strom 2003). The structural context refers to the general trend of globalization, China's transition towards marketization, decentralization and regionalized competitions. The second level of analysis is focused on the political culture. In this study some of China's distinct political norms and administrative system from western countries will be examined to understand their influence on Sino-foreign eco-city development. These could be particularly crucial contextual information for international partners engaging in Sino-foreign collaborations to understand. Political actors, at the third level of the analytical framework, correspond to the policy entrepreneurs in terms of eco-city development. They are the advocates of eco-city initiatives and can exert considerable influence in the shaping and evolvement of eco-cities. The analysis on three-level context in China can reveal the unique aspects of Chinese eco-city development and enables a deeper understanding of the momentum and dynamics behind Chinese eco-city initiatives in general.

### **2.3. Institutional transplantation**

The increasing international bilateral collaborations in Chinese eco-city development present opportunities for Shenzhen International Low-carbon Town to look out for in terms of cooperation mechanisms and collaboration features in their practices. The idea resonates with Richard Rose's argument that the first logical thing for a policy-maker attempting to tackle a problem is to look for similar examples elsewhere (Rose 1993). Drawing on others' proven experience can be a means to accelerate one's own institution development or to achieve one at lower costs when used appropriately (de Jong et al. 2002). The learning of collaboration mechanism from others relates to the institutional transplantation, or institutional borrowing theory. Institutional transplantation is one of the concepts in transfer of policies focusing on voluntary borrowings from proven programmes, policies or institutions. In the book *The Theory and Practice of Institutional Transplantation* De Jong and Mamadouh have distinguished six domains of institutional transplantation shown in Table 2 below. Based on the level of action and formality, procedures can be identified as the easiest to transplant and value orientations are the most difficult and challenging domain. The study on bilateral collaborations in Sino-foreign eco-cities correspond to the operational level of institutions

Table. 2 Different domains of institutional transplantations (de Jong et al. 2002)

Level of action	Formal Relations	Informal Practices
<b>Constitutional level</b>	Legal systems	Value orientations
<b>Level of policy area</b>	Formal regulations	Informal codes
<b>Operational level</b>	Procedures	Roles

### 2.3.1. Lesson drawing

A closely associated concept with institutional transplantation theory is lesson drawing, which covers a wider spectrum of both positive and negative practices. According to Rose lesson drawings vary in degree. It can be simply copying policy programmes, or adjusting them to the domestic context, or making new hybrids from exporting and importing region, or making synthesis by assembling desirable elements from multiple sources, or just get some inspirations. However, Rose also points out that the aim of comparative studying should not be to evaluate their influences on lesson drawing in general, but to distinguish the contingencies having a significant impact on the suitability of policy transfer. The pivotal question in lesson drawing or institutional transplantation lies in “under what circumstances and to what extent can a programme that is effective in one place transfer to another”(Rose 1993). In Richard’s work, a programme refers to an instrument of public policy aimed to achieving certain policy intentions. The suitability of a programme can be judged by examining its past performance in another country and anticipating its future consequences after transplantation.

#### 2.3.1.1. Contingencies and steps in lesson drawing

Rose proposed seven contingencies for lesson drawing which include the degree of uniqueness of a problem, the availability of resources, the interdependency between areas compared, the complexity of a policy, the scale of change an initiative involves, and the proximity of institutions and values of areas compared(Rose 1993).

In order to identify the similarities and differences in circumstances and selectively draw on a list of do’s and don’ts in accordance with the particular situation where the policy making is going to take place, Rose prescribed ten procedural steps in lesson drawing which are shown in Table 2. The seven contingencies and ten steps together provide an evaluative framework for the lesson drawings on bilateral collaborations in Sino-foreign eco-cities. Here the concept of programme is extended to the international bilateral collaboration platform in Chinese



eco-city development. By applying Rose's framework for lesson drawing into this study, experience from former Sino-foreign eco-city experience can be reviewed, evaluated within their specific contexts and selectively organized into lessons relevant for the Sino-Dutch collaboration in Shen International Low-carbon Town. In this way, the theoretical framework used in this study belongs to the fourth type of lesson drawing prescribed by Rose, namely making new hybrids by assembling desirable elements from multiple sources of international bilateral collaboration in Chinese eco-cities for the design of viable collaboration alternatives for Sino-Dutch collaboration.

Table. 3 Rose's recommendations on lesson drawing (Rose 2005)

<b>1.Learn the key concepts: what a programme is, and what a lesson is and is not.</b>
<b>2.Catch the attention of policy-makers.</b>
<b>3.Scan alternatives and decide where to look for lessons.</b>
<b>4.Learn by going abroad.</b>
<b>5.Abstract from what you observe a generalized model of how a foreign programme works.</b>
<b>6.Turn the model into a lesson that fits your own national context.</b>
<b>7.Decide whether the lesson should be adopted.</b>
<b>8.Decide whether the lesson can be applied.</b>
<b>9.Simplify the means and ends of a lesson to increase its chances of success.</b>
<b>10. Evaluate a lesson's outcome prospectively and, if it is adopted, as it evolves over time.</b>

## 2.4. Case design

In order to systematically review bilateral collaborations in previous Sino-foreign eco-cities, a case structure will first be established to organize empirical information and analysis along different dimensions. The case study will be operationalized majorly revolving the following questions: how is the project initiated; what are the goals and plan of the project; what features characterize the project; what's the background of the project; who are the main parties involved and what are their goals and resources in this project; how is the collaboration organized and what does its institutional arrangement look like; what degree of political support did the project receive; how does the project proceed and what results has it achieved; what success factors of collaboration can be identified in the project. As is shown in Table 4, each section is dedicated to answer one of the questions accordingly in the following chapters of case studies.

Table. 4 Case design

Section	Question	Explanation
<b>Introduction</b>	How is the project initiated?	A look at the project origin helps to identify the initiators of the project who are usually the main actors involved in the project later. It also reveals how the actors came into contact and formed the collaboration intention.
	What are the goals and plan of the project?	Since the concept of eco-city is loosely defined and each city endeavors to build a tailor-made eco-city, these selected Sino-foreign eco-city projects vary in size and scale. The goals and plans collaborating parties set ahead may convey the message of the degree of commitment and intensity of bilateral collaboration.
	What features characterize the project?	The unique aspects about a project reflect specific conditions and resources of collaborating parties. Features of an eco-city project may include special local geographical conditions, targeted and well-pronounced goals, innovative approach, or prominent project status such as being positioned as a government-to-government collaboration.
<b>Economic and political background</b>	What's the background of the project?	In this part an analysis into the political and economic background of the project will be introduced to develop a wider picture of the overall climate of political relation and economic connections behind a bilateral cooperation project. This is especially relevant for some of the government promoted collaborations, in which national strategic interest may be the direct motivation for joining the collaboration.
<b>Goals and resources of key collaborating</b>	Who are the main parties involved and what are their goals and resources in this	The examination on goals and resource of key collaborating parties is conducted to see how the resources owned by each side correspond to other's needs, namely the resource interdependencies in the collaboration. What each party wants out of the project can also reveal the

<b>parties</b>	project?	degree of match of expectations between collaborating parties.
<b>Institutional arrangement</b>	How is the collaboration organized and what is does its institutional arrangement look like?	Institutional arrangement anatomy discusses how the power positions and trust between major parties have formed the dynamics that eventually shape up the collaboration model. Here we identify the formality of interactions between collaborating parties and presence of leaders and promoters through the organizational arrangement.
<b>Political support</b>	What degree and form of political support did the project receive?	As most of the bilateral cooperation in Sino-foreign eco-city projects involves political leaders and multiple government agencies, the political support they receive may be an important resource influencing the viability and intensity of bilateral collaboration in Sino-foreign eco-cities and will be discussed in this part.
<b>Progress and results</b>	How does the project proceed and what results has it achieved?	The issues unfolded during later stages may insinuate clues of some underlying discords between collaborating parties. It is particularly interesting to see if the problems had to do with the insufficiency of the collaboration mechanism, which could provide valuable lessons for other Sino-foreign eco-city projects. Similarly, the achievements the project accomplished may prove the efficacy of the collaboration, indicating successful experience to be drawn upon. In recently initiated new projects a snapshot of the current status is provided in this part.
<b>Identified critical success factors</b>	What success factors of collaboration can be identified in the project?	Through the above analysis, a set of critical success factors for collaboration in each project can be identified. Together they constitute a framework of success factors influencing collaboration, which later can be used to develop an evaluative framework of bilateral collaboration models.

### 3. Sino-Singapore collaborations

#### 3.1. China-Singapore Suzhou Industrial Park (SIP)

##### 3.1.1. Introduction

Since China's open market reform in 1992, a series of expansionary monetary policy have been established to stimulate nationwide economic growth. Consequently, within months China has seen a surge of development across the country, indicating the need for further boost by enlarging the scope of market functions. The open door policy has attracted many foreign investments to help China modernize its economy. By 1992, Singapore has only a small amount of investments in China mainly from private investors. Having realized that the lack of aggressiveness may jeopardize its ability to capitalize on the burgeoning opportunities in the early phase of China's open market reforms, Singapore determined to catch up with other countries and to increase its presence in China. The SIP project was just prompted by such an impetus at that time. When Singapore's then Senior Minister Lee Kuan Yew and then Deputy Prime Minister Ong Teng Cheong visited in Suzhou in October 1992, the mayor of Suzhou proposed the possibility to collaboratively develop a township in Suzhou following Singapore's Jurong Town Corporation (JTC)'s industrial park model. After the feasibility study trip, a site of 288 km<sup>2</sup> near Jinji Lake in the east of Suzhou was identified as a suitable area for the development of an industrial township. An in-principle agreement of the co-development of 80 km<sup>2</sup> within the site was signed between the Suzhou municipal government and the Singapore Labour Foundation International in May 1993 (Stewart 1992). However, by then the Singapore government hadn't decided yet whether they will transfer their software management skills to China in this particular SIP project. Fierce competition for this software transfer program took place between Suzhou City, Shandong Province and Ningbo City. After lengthy discussions and negotiations, Suzhou finally won the program as part of SIP project. February 26, 1994 saw the signing ceremony for the *Agreement on the Joint Development of Suzhou Industrial Park* by Chinese Vice Premier Li Lanqing and Singapore's then Senior Minister Lee Kuan Yew. The SIP project was officially started on May 12 in that same year (RightSite Asia 1994).

The development of SIP is divided into three phases. In Phase I an 8 km<sup>2</sup> area near the old city was to be transformed into a central industrial and commercial district integrating finance and tourism industries. The commercial section in Phase I area was designed to be the central business district of SIP. Phase II involved the development of a roughly 23 km<sup>2</sup> area as a high-tech industrial district adjacent to Jinji Lake. The rest of the 32 km<sup>2</sup> area near Shanghai in

Phase III was planned to accommodate technology intensive manufacturing and processing industries(People Daily 2012). Based on the master plan, detailed implementation plans had been drawn up to form an integrated and scientific designing system. Since attractive housing and high quality of life had been prioritized on the model of Singapore's Housing Development Authority, not only the necessary infrastructure but also complementary social security system and health facilities would be developed to make SIP an integrated satellite city.

### **3.1.2. Economic and political background**

SIP project has important political and economic connotations back at in the beginning of 1990s. During China's economic reform, Singapore's development trajectory of political authoritarianism and economic liberalism attracted the top Chinese leaders. Singaporean state has led the way in the strategic planning and governance of its economic development through its centralized political system. China wants to follow Singapore's development pattern and tap into their experience without the concern of overly idolizing the Western model of modernization underlain by liberal democracy. Singapore, on the other hand, has realized with increasing global competition, their achievement of sustainable growth also relies on the capability of tapping into the growth potential of other countries. This context has given rise to Singapore's regionalization strategy which promotes its firms' presence in external booming market with state-owned enterprises as the spearhead. In January 1993 Singapore's Senior Minister Lee Kuan Yew announced the state's vision to develop the "external wing" for the Singapore economy by launching new initiatives encouraging more local entrepreneurs(Lee 1994). China's fast development in the past decade makes it one of the most important overseas regionalization targets for Singapore. However, the small amount of investments in China from Singapore's private sector prompts Singapore government to take a leading role and assume the risks of venturing into the vast Chinese market in the early phase. By negotiating the institutional framework for bilateral collaborations, Singaporean government endeavors to create more opportunities for Singaporean private capitalists in China. The shared interests of China towards modernization and foreign investment attraction, and Singapore to establish its presence in China, coupled with the historical background of the "Asian miracle" period at the beginning of the 1990s, have lead them to join forces and set up a government-to-government cooperation project. Here we identify the factors "***political relation***" and "***economic connections***" as the most important driving forces behind SIP and aligned their shared interests.

### **3.1.3. Goals and resources of key collaborating parties**

As one of the most developed countries, Singapore owns considerable resources for the collaboration. Many government-linked Singaporean companies are the most potent instruments for carrying out the flagship project. These former state-owned companies are strongly influenced by the Singapore government through state-owned holding companies. They usually have rich experience and resources in large construction projects, which are exactly what the private companies need in oversea ventures. Together with the government-linked companies, Singaporean private sector companies form consortia or joint ventures in foreign countries as part of the regionalization strategy. Most relevantly, the Singaporean urban planning expertise, especially the infrastructure blueprint is what the Chinese need during its urbanization course. The industrial and investment landscape in Jurong Town Corporation model attracts the Chinese most since it provides advanced readily-built industrial facilities and spaces that allow foreign investors to start operations within a short time(Han 2008). Except for the hardware and urban planning skills, Singapore owns advanced management software that gained international recognition in efficiency, transparency and meritocracy. China, on the other hand, is in urgent need of adaptable and advanced administration and business methods due to the fundamental shift in the political and business systems towards decentralization. A gap in the managerial talent pool during China's reform emphasized the importance of knowledge transfer and policy making processes in the governance at both public and private sectors from the Sino-Singapore collaboration.

There seems to be some mismatch in the resources and rewards in this project on the Chinese and Singapore sides. While China expects direct benefits out of this collaboration, Singapore took a longer view and considered this project as a conduit for the bilateral political and economic relations. With the project in hand, Singapore's new generation of leaders can open regular dialogues with China and promote mutual understanding and opportunities in the long run. The Sino-Singapore industrial park project was thus viewed by Singapore as a strategic cooperation serving great interest at a national level.

Under the positive national economic climate in 1992, Suzhou was actively embracing the reform policy with the establishment of development zone and infrastructure investment projects like many other Chinese cities. For Suzhou, being selected as the site for the flagship Sino-Singapore collaboration project is first a great honor which helps it to win the attention from the national government. More practically, the Singaporean brand name will distinguish Suzhou from other Chinese cities representing an open economy and advanced market system. Since FDI was becoming a crucial factor in China's development during the 1990s, the

international element of Sino-Singapore collaboration can be its winning edge in the competition for foreign investment attraction. With its advantageous geographic conditions, Suzhou was eventually chosen out of competing provinces and cities like Shandong and Ningbo. Situated in the one of China's richest province Jiangsu, Suzhou is 55 miles west of Shanghai. In addition, Suzhou has abundant cultural and intellectual heritage evidenced by the thriving research institutes, universities and vocational schools in its vicinity. The market in Suzhou was not saturated at that time, creating more potential for Singapore to tap on against the background of focused development of Yangtze River Delta in China. The hinterland within Suzhou is also an important advantage securing its triumph over Shandong(Han 2008).

The inspection into resources own by collaborating parties revealed the “**resource interdependencies**” between Singapore, China national government and Suzhou municipal government. Noticeably, Suzhou municipal government could benefit from the Sino-Singapore govern-to-government project not only in terms of local infrastructure development, foreign investment and the software package, but also the prestige and attention from central government. This relates to the “**capacity potential**” factor in the theoretical framework. Suzhou as a prefectural-level city far away from the political nerve of China was eager to get more support from central government, especially when it witnessing the rise of Pudong New Area from 1990 in its neighboring metropolis Shanghai. Suzhou needs the rebranding effect brought by such an opportunity to retain its local identity. Moreover, with more resources and expertise available in the project, Suzhou can strengthen its decision-making capacity through the exemplary SIP project.

The underlying interests of national governments, Suzhou municipality and Singaporean companies also they have different expectations for SIP project. Looking into the historical context, it can be recognized that Singapore has the national interest to demonstrate itself in the “show-case” project of SIP and create opportunities for more Singaporean companies to gain a foothold in the Chinese market. For the Singapore government, SIP went beyond a joint venture measured by financial success. The application of their management skills, the creation of a thriving community with social harmony, and the establishment of well-organized Singapore-style institutions that can be duplicated across China are also important aspects of SIP's success. The Chinese government on the other hand concerned more about the new foreign investments it was going to get from SIP, the advanced physical infrastructure laid down there and the procurement of Singaporean management software. However, more fundamental differences in expectations existed between Suzhou municipal government and Singapore. It can be argued that though Singapore and Chinese national governments attach great importance to the software transfer program, Suzhou municipal government was more

interested in the hardware transfer. The short-term political representation at the local level led Suzhou officials focus more on the development of new factories, more employment opportunities, and more revenue collections out of SIP. With the decentralization of Chinese political system, local government assumes the responsibility of local economic development, and their success is largely measured by the regional GDP growth rate. Although SIP was positioned as a government-to-government collaboration, most of the decision makings were made at the local level with little inputs in implementation from Chinese central government. These differences reduced SIP's performance on the factor of "**match of expectations**" and affected the priority setting and execution in the later phase, eventually causing the Singapore side to lower their stake during the restructure.

#### 3.1.4. Organizational arrangement

Once the 80 km<sup>2</sup> area near Jinji Lake to the east of Suzhou was confirmed as the cooperation site, lengthy and tough negotiations about the detailed collaboration arrangements ensued between the Suzhou municipal government and Singaporean consortium. Having more resources on the table to contribute to the project, the Singaporean consortium took an aggressive role and bargained hard in the negotiations. Establishing itself as astute businessmen independent of the Singapore government, the Singapore consortium took on a more practical view on this investment project and strove to ensure more control over the JV while still managing potential risks at an acceptable level. According to some former Singapore bureaucrats and former Suzhou municipal government leaders in a paper on the SIP project, the initial 65%-35% share ratio between the Singapore and Chinese consortium was proposed by Singapore in order to take the controlling stake in the partnership(Han 2008). Suzhou municipal government didn't object to this shareholding stake; however, they were annoyed at a series of preconditions mooted by the Singapore consortium. These were regarded as a sign of lack of confidence and kind of manipulation since in their perception the Singapore consortium were coupling the JV with software transfer program and force them to accept the sometimes "unduly" requests. This is the moment when the "**trust**" issues come into play. In the hard negotiations with Singapore consortium, Suzhou municipal government was at an inferior "**power position**". First, Singapore consortium had rich and crucial resources Suzhou municipality had to rely upon; second, in this flagship Sino-Singapore collaboration Suzhou was the 'lucky' one that got chosen to benefit from Singapore's knowledge and resources on behalf of China. Singapore consortium realized this and used the issue coupling technique to bring in the software transfer program. Admittedly, software transfer program was directly sponsored by the Singapore government(Han 2008). The strategic use of software



transfer program as an exit option by Singapore consortium has incurred the dissatisfaction of Suzhou municipality and was perceived as insincerity and mistrust. However, the prestige of national level collaboration project, the abundant resources on the Singaporean side, and the desire to build a successful industrial park with an authentic Singapore model and management concepts, made municipal government quite accommodating( at least in their perceptions) to the Singapore consortium. In addition to the dominant share in the JV, all the department heads were to be appointed by Singapore consortium. Singapore, on the other hand, facing different and unfamiliar policies in China, also had made reluctant compromise in major issues (e.g. the agreement on an equity JV instead of cooperative JV, though the latter was preferred by the Singapore consortium). Such highly compromised arrangements might have largely influenced both sides' working attitudes, which are later exacerbated by unexpected cost overrun and unfavorable financial climate, and eventually led to the restructure in 1999.

Through struggling negotiations, a three-level collaboration model was eventually established for Suzhou Industrial Park(Han 2008). The top level is a China-Singapore Joint Steering Council (JSC) chaired by the deputy prime ministers of China and Singapore. It clearly signifies the top level national support SIP uniquely enjoyed. JSC are responsible for macro-level state policies and meet once every year for progress review. The following level is the China-Singapore Joint Working Committee (JWC) headed by the Suzhou Mayor and the Chairman of Singapore Economic Development Board. Members of JWC include relevant Jiangsu, Suzhou and Singapore government officials, and they meet roughly four times a year to deal with issues in the SIP directly. The last level consists of the joint venture company named the China-Singapore Suzhou Industrial Park Development Corporation Ltd (CSSD), and the Suzhou Industrial Park Administrative Committee (SIPAC). CSSD is a 65%-35% joint venture between the Singapore-Suzhou Township Development Pte Ltd (SSTD), a Singaporean Keppel Corporation-led consortium and the Chinese consortium named China Suzhou Industrial Park Company Ltd (CSIPC). As is mentioned above, most of its internal department heads were from Singapore, giving it a distinctive Singaporean character. SIPAC on the other hand, is the main Chinese authority for all administrative matters of SIP and the Singapore government's software transfer program. SIPAC is comprised of Chinese officials from Jiangsu provincial government (People Daily 2002). After purchasing raw land from SIPAC, CSSD is responsible for infrastructure development and then selling prepared land to investors. The initial organizational structure of SIP was shown in Fig.2 below.

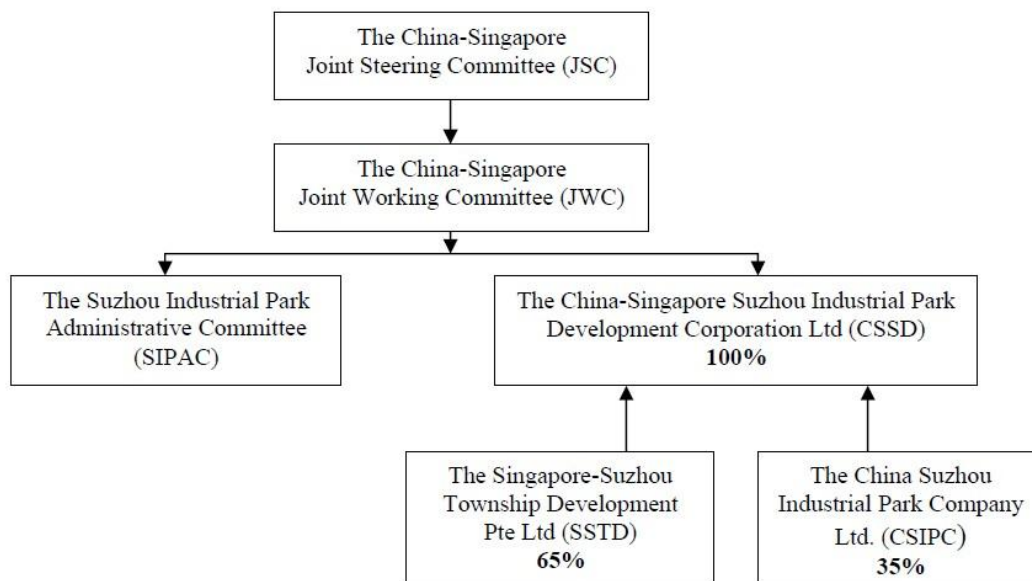


Fig. 2 Initial organizational structure of SIP in 1994 (Han 2008)

Such a highly-formal and clear organizational structure signifies the importance both countries attached to the collaboration. Both JSC and JWC have regular meeting agendas, and clear division of daily project work has also been allocated between SIPAC and CSSD. SIP in this sense scores high on the “formality” factor which favors the cohesion of collaboration.

Applying the theoretical framework proposed in the paper, it can be observed that the China-Singapore Joint Steering Council (JSC) and China-Singapore Joint Working Committee (JWC) correspond to the “involvement of leaders” factor. The two councils clearly assigned key leaders and officials in the collaboration to ensure that resources from multiple levels of government agency were mobilized for the project. SIPAC and CSSD together constitute the “promoter” of SIP, driving the implementation process by bringing various companies into the project, and report the progress to the leaders in JSC and JWC.

In line with this organizational structure, the collaboration of SIP consists of the software transfer program and the private-sector venture of developing SIP into an industrial, commercial and residential township following Singapore’s development model. The software transfer program aiming at sharing Singapore’s experience in public administration and economic management with Chinese authorities for establishing skills, policies and processes that encourage business growth was directly sponsored by the Singapore government(Han 2008). This corroborates with both countries’ wishes to transplant Singapore’s development model in China and to create more mutual opportunities. In the JV between private sectors,

based on the considerations for SIP's commercial viability, the Singapore government made Keppel Corporation taking the lead in the township project instead of the Singapore Labour Foundation International who originally signed the in-principle agreement with Suzhou municipal government.

### **3.1.5. Political support**

As a strategic collaboration between Singapore and China, SIP received enormous political support from national government. It enjoys the same status as China's five Special Economic Zones and Pudong New District of Shanghai. It was also given preferential policies including tax incentives with corporate tax reduced to 15% (compared to 30% in most part of China) and exemption of local income tax, the authorization of SIPAC for investment approval without upper limit of the total amount of investment, and one of 15 experimental Export Processing Zones which had the privilege of "operating within the territory yet beyond customs tollgate"(People Daily 2012).

### **3.1.6. Progress and results**

In terms of development plan, SIP aims to transform the agricultural land outside the Suzhou municipality into an industrial, commercial and residential community for a projected population of 600,000, including a workforce of about 360,000. Structured as an Equity Joint Venture, the partners originally were to commit \$ 20 billion over twenty years, for which the Singapore consortium would contribute 65% and the primary management responsibility. A transparent and efficient governance model was planned to be built for promoting the prosperity of the community. While SIP was intended to be duplicated across China as an exemplary industrial park, the software transfer would add the unique Singaporean ingredient to SIP and constitute the core competitive advantage of SIP over other Chinese industrial parks.

However, SIP suffered from accumulated losses since 1994. One of the major cost overrun sources came from the land price. The site chosen for SIP was an area of farmland in the east of Suzhou. Such a choice is based on the project's need of having a large tract of land available to build from scratch. However, the Chinese law stipulates that acquisition of agricultural land is limited in amount and needs to make corresponding compensations for the lost farmland and lost crops, and the resettlement for farmers who lost the land. Moreover, as the tract of land is a low-lying area, it was not well suited for industrial and commercial development(Han 2008). Though the Suzhou municipal government tried to offer the best raw land prices for the Singapore government and conceded to retain reasonable flexibility for revising the land price

for the second phase of development, the land preparation including some earth fill work to raise the land level, together with compensations, has incurred significant cost overrun.

The trouble with high land development costs has dragged in another issue of the bitter competition with Suzhou New District (SND). Prior to SIP, SND was approved by the Chinese central government as a “National level High-tech Park” in 1992 (SND 2004). As SND is situated on the high land in the western part of Suzhou, it hadn’t encountered the high land price problem and was therefore able to offer much cheaper land prices to investors. Reportedly, some Singaporeans have argued that the Suzhou municipality favored SND over SIP and were suspicious that SND had been subsidized by the municipality so as to charge lower prices (Han 2008). The competition with SND has undermined the **trust** which is already shaky during the negotiations. Such speculation also brings in a more delicate issue of rewards and benefits division under different policies. Since SIP was a privileged project, it enjoys taxation incentives as described earlier. Consequently, most of SIP’s revenue stays with the management instead of going to the municipal government of Suzhou (which is the case with SND). In this sense, the privileged policy incentives had as well possibly undermined the smooth cooperation at the local level in the joint venture. Astonishing as it is, it posed a vital problem for both the Chinese government and the collaborating foreign partner to deliberate over the policy making and interest alignment for such collaboration projects. It is pivotal to make sure that the goodwill of the incentives can be realized in the specific local context without causing potential negative effects.

External influence aside, one paper on the SIP project pointed out that SIP’s failure in attracting target Japanese investors was rather stemming from its insufficient understanding of their investment patterns within the specific context in China (Han 2008). SIP had been struggling to attract major Japanese investors after committing significant resources into the infrastructure development within the park. Though SIP was equipped with technically superior infrastructure and services, the key Japanese investors also deemed the costs, the vicinity with related suppliers and networks and culturally specific business working methods and behaviors as important (Han 2008). Singapore was initially confident with their successful experience in attracting foreign investments, and SIP is supposed to be a jumping platform for foreign investors interested in venturing into the Chinese market. Singapore felt that with the assurance of the Singaporean management style, foreign investors would be more comfortable to choose SIP as their investment location. However, some foreign investors, especially those from Asian countries like Japan already had some experience in China and thus thought of less of the familiarity factor and took on a long-term view by adapting to the local conditions of the host country to achieve maximum profits out of investments. SND was established earlier and

already had some Japanese companies there; additionally with the price advantage, it easily became the more favorable option for major Japan investors.

In addition to the discords brought by SND, the two parties' differences in interaction patterns also increased the tension. Reportedly, the deputy Suzhou mayor had complained that when the Singaporean consortium had a different opinion, they communicated directly with the Singapore government, who would later inform the Chinese central government of it. The Suzhou municipality government felt this was an inappropriate procedure giving them more pressure from central government. The Singapore consortium might consider it as a government-to-government collaboration and seek to have inter-government dialogue. Such different perceptions may stem from the **disparity of hierarchical structures** in China and Singapore. As a small-sized country, Singapore has essentially an one-layer government. China on the other hand is one of the biggest countries in the world with a five-level government structure(Han 2008). Though the governance model is intrinsically hierarchical and centralized, the geographical scattering and limited government capacity in China still leaves considerable autonomy to local governments. The Singapore consortium has ignored this contextual information and incurred more frustration on both sides without direct discussions with the Suzhou municipal government. It should be pointed out that in China where top-down decision-makings dominate, the active and open communication at lower levels may be more important. For one thing, the agents from the foreign country would have more chances to learn the contextual information for the specific cooperation and save the efforts to communicate through several layers. This will help to avoid unnecessary misunderstandings and mistrust during the course. It also helps to encourage wider participation of local stakeholders. The insistence on government-to-government dialogue negatively affected the inclusion of actors, at least in their perception. Open and direction communication with local government will give them more impetus to align their interest in the project and commit themselves in the collaboration, instead of just following the orders from upper level with a conservative attitude. Although it may seem easier for the Singapore consortium to take advantage of the government-to-government privilege and force a desired decision upon the Suzhou municipal government, such a shortcut may backfire and lead to unexpected result. When Singapore's then Senior Minister Mr. Lee Kuan Yew reported some problems in SIP to China's then President Mr. Jiang, the mayor of Suzhou expressed his dissatisfaction about the way Singapore consortium dealt with differences and problems in front of Singapore media. The mayor was subsequently sent away on one year's leave of absence to the Harvard Business School(Thomas 2001). The authoritarian governance mode in China and Singaporeans' reliance on top-level dialogue has put Suzhou municipal government in a dilemma where they have

primary management responsibilities and asymmetrical autonomy. Singapore's ignorance of the multi-level political structure in China may have caused a price on the SIP project with increased tension.

The Asian financial crisis in 1997 also gave SIP another major strike in its already not optimistic situation back then. As a result, SIP underwent a restructure in June 1999 with the Suzhou municipal government's stake increased to 65%. In the new MoU it was also confirmed that only the first 8 km<sup>2</sup> will be completed by the Singapore consortium, leaving the rest 70 km<sup>2</sup> to the Chinese counterparts(Han 2008). With the primary control and management responsibilities given back to the municipal government of Suzhou, SND consequently turned into a partner with SIP. Things started to look up from 1999 onwards, by the end of 2001 SIP generated profits. Now SIP is a joint venture that is 52% owned by the Chinese consortium and 28% owned by SSTD(Mitsubishi Corporation 2012). Today SIP hosts 46 corporate headquarters, 22 financial institutes and 137 operations by Fortune 500 companies(Zhou Furong and Yi 2012) . SIP has achieved a sustained average annual economic growth rate of 30% during the past years. It is reported that in 2011 SIP ranked the first in national development zones in using foreign capital as well as in terms of ecological and environmental indicators. The same year saw SIP securing the first place in Suzhou in urban average annual disposable income, rural net income and comprehensive score on transformation and upgrading. It also became the first environment and energy exchange in Jiangsu Province featuring low-carbon economy. It is remarkable that SIP contributes roughly 15% of the economic outputs of Suzhou with only 3.4% of the total land and 5.2% of the total population of the Suzhou city(CSSD 2012).

SIP is currently undergoing a transformation towards "a high-tech industrial park with an international competitive edge, as well as an innovative, eco-friendly and information-based city" since the economic crisis(People's Daily Online 2010). SIP used to be a highly export-oriented industry zone and was therefore hit hard by the previous economic crisis. As resources like available industrial land are becoming increasingly scarce, SIP also realized it has to make changes and upgrade its industries in a more balanced way. The major themes of SIP's development in the coming years include biomedicine, nanotechnology, microelectronics and communications, media and animation, as well as environmental protection. Six key development areas have been distinguished on the transformation path: Dushu Lake Science-Education Innovation Park, Jinji Lake Central Business District, Ecological Science Hub, Integrated Free Trade Zone, Phase-3 New and Hi-Tech Industrial Zone, Yangcheng Lake Eco-Tourism Resort(People Daily 2012). In 2011 there are 1,500 companies with total revenue of 22 billion RMB, 22 colleges with 28,000 students and faculties within the innovation park(Linda 2012).

Another growing trend in business tourism has also been observed in SIP over the recent years. SIP received more than 3.6 million tourists from January to September in 2011, making it the area with fastest growth in tourism revenue across such a popular destination as Suzhou(Zhou Furong and Yi 2012). The heavy investment in entertainment and research facilities has paid off; visitors were attracted by the modern technology and amenities and came to SIP for exhibitions, conferences or factory tours.

### **3.1.7. Identified critical success factors in collaboration**

Based on the case study on Suzhou Industrial Park above, the critical success factors can be identified as stable political relations, close economic connections, strong resource interdependencies, capacity potential(for Suzhou City), involvement of top-level leaders, and a clear organizational structure. The negative or insufficient factors undermining the collaboration are mismatch of expectations, mistrust, imbalanced power positions, disparity of hierarchical structures on the two sides, and the competition in neighboring area (SND).

## **3.2. Sino-Singapore Tianjin Eco-city (SSTEC)**

### **3.2.1. Introduction**

In 2005 Singapore and China agreed to further their cooperation in regional development. In April 2007 during a meeting with Chinese Premier Wen, Singapore's then Senior Minister Goh Chok Tong mooted the idea of developing an eco-city jointly in China. The proposal was readily agreed to by China's national government. Through comprehensive evaluations, a site in Tianjin Bohai New Area was chosen for the eco-city project. On November 18th 2007 the Framework Agreement for Sino-Singapore Tianjin Eco-city was signed by Premier Wen and Prime Minister Lee, which officially kick-started the project.

Tianjin Eco-city is envisioned to be "a thriving city which is socially harmonious, environmentally-friendly & resource-efficient –a model for sustainable development". The environmental, societal and economic harmonies are clearly established in the objectives, along with an emphasis on replicability, practicality and scalability(Leng 2010). An integrated and incremental approach was designed for the project which promotes integrated land use and urban transport while balancing employment and housing supply(The World Bank 2009). Six dimensions of sustainable development were included in the master plan, namely intelligent city, clean water, ecology, clean environment, clean energy and green building(The

World Bank 2009). There is also a strong focus on the adoption of renewable energy and recycle of resources across different sectors. A set of Key Performance Indicators covering environment, society and economy aspects was also developed to guide the implementation and evaluation(Government of Singapore 2008).

As is established in the beginning, SSTECS overall economic vision is to encourage high economic growth while maintaining low greenhouse gas emissions. To achieve this goal, high value-added, environmentally friendly and energy-efficient industries are targeted as the backbone of the economic structure for SSTECS. The foundation of the proposed economic structure will be based on real estate and green buildings, producer services, R&D and higher education in environmental sciences, conference facilities and related service jobs(The World Bank 2009).

The implementation of SSTECS is divided into three phases: Phase I has already started in 2008 and is expected to hold 85,000 residents within a 4 km<sup>2</sup> start-up area in the southern district by 2013. Phase II (2011-2015) is planned to focus on the central district and the development of major infrastructure and transport network connecting surrounding regions especially Tianjin Binhai New Area. A following five-year from 2016 to 2020 will extend the development to the northern area and eventually house 350,000 people in 34.2 km<sup>2</sup> area(The World Bank 2009).

### **3.2.2. Economic and political background**

As China's eighth largest trade partner and the seventh largest investor, Singapore has been actively enhancing economic relations with China. From the former SIP project Singapore has accumulated much contextual knowledge and experience in collaboration with China. The two countries had reached a common vision with shared interests and mutual trust against a highly complex global economic backdrop. In 2005, both countries agreed to enhance their political and economic cooperation during Singapore's current Prime Minister Lee Hsien Loong's first official visit to China after he took office in 2004(People's Daily Online 2005). Statistics showed that by 2005 more than eighty percent of Singapore's investments in China were in real estate, tourism and industrial sectors(Kim 2005). China and Singapore's determination to strengthen bilateral relations in economic development has laid the foundation for the later Sino-Singapore Tianjin Eco-city project. Just soon after the signing of Sino-Singapore Eco-city Framework Agreement, a bilateral free trade agreement was established between China and Singapore in October 2008 aiming to further open business opportunities for both countries to boost their exchange of goods, services and



investments(Fong 2008). Having considerable investment experience in China's real estate market, Singapore was keen to take a step forward. After recognizing China's urgent need for sustainable urban development, Singapore wanted to apply their expertise in urban planning and explore more opportunities in sustainability filed. Thus Sino-Singapore Tianjin Eco-city (SSTEC) is a logical opportunity for Singapore to showcase its expertise in the sustainability domain while strengthening the bilateral diplomatic and economic relations with China through another benchmark project. To sum up, SSTEC is motivated by **political relation** and **economic connection** reasons, as well as the intention to promote environmental cooperation between the two countries.

### 3.2.3. Goals and resources of key collaborating parties

Facing increasingly severe environmental degradation and the need for continued urbanization, Chinese national government had established clear goals towards sustainable development in its 11<sup>th</sup> five-year development plan. Singapore is the ideal partner for China to realize its sustainability ambitions since Singapore has proven successes in urban planning for sustainable development. Their experience in public transportation, affordable public housing and water management are exemplary for the world. After the two sides concurred on the collaboration intention of an eco-city development, Chinese then Vice-Premier Wu Yi put forward two principles regarding the site selection in July 2007 when she met Singapore's Prime Minister Lee. The eco-city has to be developed on non-arable land lacking in resources, especially water; ideally it should also be adjacent to major cities to take advantage of existing infrastructure and services and save construction costs(Leng 2010). From the established theme and the site selection principles, it can observed that China wants to tap into Singapore's experience in land revitalization and efficient use of natural resources, especially Singapore's expertise area in water management.

The political prestige and economic potential in the flagship project has attracted many Chinese cities and the Construction Ministry was at a time deluged with city representatives and their Singapore contacts. Despite the lobbying, the choice was eventually narrowed down to four cities: Baotou (Inner Mongolia Province), Tangshan (Hebei Province), Tianjin and Urumqi (Xinjiang Province). According to Senior Minister Goh, the eco-city has to be commercially viable and replicable in other parts of China, thus ruling out Baotou and Urumqi given their extreme and unusual geographical conditions. Through comprehensive evaluation by both sides on aspects including ease of site accessibility, state of development of the surrounding infrastructure and economic potential, Tianjin finally emerged as the winner city(Quek 2007).

Singapore saw the site's strategic location in the new fast growing hub of Tianjin Binhai New Area (TBNA). TBNA is situated at the juncture of Beijing-Tianjin city development spine and Bohai coastal development belt, consisting of three administrative regions of Tanggu, Hangu and Dagang District. It also ranks the third important economic development area in China following Shenzhen in the 1980s and Shanghai Pudong in the 1990s(The World Bank 2009). In addition, TBNA was entitled as China's National Pilot District of Comprehensive Reforms and Innovation. The site chosen for the Sino-Singapore eco-city sits in TBNA that is 40 km from the Tianjin City Center and 150 km from Beijing. With such geographic advantages, SSTECH undoubtedly can benefit from the confessional policies in TBNA and the synergy in fast-track development. As for environmental conditions, most part of the 34.2 km<sup>2</sup> area is saline or non-arable land. The nature of wasteland-to-community experiment makes the project a true challenge and at the same time an opportunity to make a difference and to "create the future from a low base", quoting the words of CEO of the JV for SSTECH(Wong 2008). By building a city in less favorable conditions, it would showcase a new mode of city development with less impact of urbanization on agricultural land.

For Tianjin Bohai New Area, the most direct benefit from SSTECH is the addressing of fast growing demographic and housing demands there. Along with the rapid economic growth in TBNA comes increasing migrant work force. Nearly 50% of the Tianjin's new urban population comes from TBNA, making it a serious challenge for TBNA to absorb the continuously growing influx of population(The World Bank 2009).Initially conceived as a centre for export-oriented industries and manufacturing, TBNA was lagging behind in housing development. The government has allocated limited amount of land for urban residential use in TBNA, and most of the residential land is now under Tianjin Eco-city's development plan(Wong 2008). SSTECH therefore assumes the major responsibility of housing supply and residential community development for TBNA. In addition, SSTECH's core businesses in ecological enhancement and protection, green tech R&D and creativity constitute a niche market in TBNA, making it a fit in the ecosystem of TBNA in the longer term. The "**capacity potential**" factor also plays a role here as SSTECH opens another dialogue channel between TBNA and central government. With the exemplary eco-city nature of SSTECH, TBNA will spearhead in China's development trajectory towards sustainable urbanization. The momentum and synergy brought by SSTECH will further strengthen TBNA government's decision-making capacity and gives it a stronger local identity. Based on the analysis above, it is clear that there exist **resource interdependencies** between Singapore, China national government, and Tianjin Bohai New Area.

Singapore's government-linked companies again served as the main instrument in this

collaboration. Keppel Group was the leading company in the Singapore consortium. Notably, these Singaporean companies have the capacity and patience for the long-term, slow yet stable returns from projects like Tianjin Eco-city. All the Singaporean companies in the consortium are publicly listed, clearly showing the profit-driven nature of the SSTECH project. Their well-balanced project portfolios with both short/medium-term and long-term payoff projects, and the backup from Singapore government enable them to pursue such initiatives that serve their strategic purposes. Singaporean companies have sound project and logistical management experience, their technological expertise also provides direct input to the project. In addition, Singapore government appointed related urban development agencies to join SSTECH to pass on their experience in the initiative, among which there are the Land Transport Authority (LTA), Housing Development Board (HDB) and Urban Redevelopment Authority (URA)(Briomedia Green 2012). Chinese counterparts on the other hand, provide the deep understanding and insight of the local market in terms of the social, political and cultural context of operations in Tianjin and China.

#### **3.2.4. Organizational arrangement**

To combine different strengths of Chinese and Singaporean parties, the master plan for SSTECH was jointly developed by China Academy of Urban Planning and Design, Tianjin Urban Planning and Design Institute, Design group of Urban Redevelopment Authority of Singapore, Tianjin Municipal Commission of Urban Planning, Rheinschiene Designing Group, and Kalarch Design Group(FinPro & FECC 2011). In line with the bilateral nature of the collaboration, a 50/50 joint venture named Sino-Singapore Tianjin Eco-city Investment and Development Company was set up between the Chinese and Singaporean consortium for Tianjin Eco-city. The Chinese consortium was led by the state-run Tianjin TEDA Investment Holding Co.,Ltd (35% in the consortium), along with China Development Bank(20% in the consortium), Tianjin Real Estate Development and Management Group Ltd(15% in the consortium), Tanggu Urban Construction Investment Company(10% in the consortium), Tianjin Hanbin Investment Co. Ltd(10% in the consortium), and Tsinlien Group Assets Management Co., Ltd(10% in the consortium). Its counterpart, the Singapore consortium Singapore Tianjin Eco-city Investment Holdings Pte.Ltd was led by the Keppel Group with a 50% stake in Singaporean consortium. The SSTECH JV is appointed as the official primary developer for the Tianjin Eco-city, while China Development Bank will be mainly responsible for financing issues. According to the Commercial Agreement between the two consortia, the Chinese side will be responsible for acquiring land and constructing basic infrastructure, public buildings and transportation network, and the Singaporean counterpart will be involved in the development of some infrastructure, residential and commercial real estate(The World Bank 2009). In order to drive

and supervise the inter-government project, a joint steering council chaired by China's Vice Premier Wang Qishan and Singapore Deputy Prime Minister Wong Kan Seng was established. Following the top-level leadership is a joint working committee at the ministerial level headed by the Chinese Minister for Housing and Urban-Rural Development and Singaporean Minister for National Development respectively. As for city administration, a Chinese local authority named Sino-Singapore Tianjin Eco-city Administrative Committee (SSTECCA) was given an integrated mandate for the overall processes of planning and implementation. The committee reports directly to Tianjin municipal government and Binhai New Area Administrative Committee (The World Bank 2009). The initial organizational structure of SSTECCA is shown in Fig. 3. Later in January 2011, Singapore also formed a Ministerial Committee consisting of ministers from National Development, Finance and Transport, Environment and Water Resources, and Foreign Affairs to better support the involved government agencies for the SSTECCA project (ChannelNewsAsia 2011). The intensive degree of attention and involvement from both governments marked the significance both countries have attached to this collaboration and its eminent position as a flagship eco-city in China.

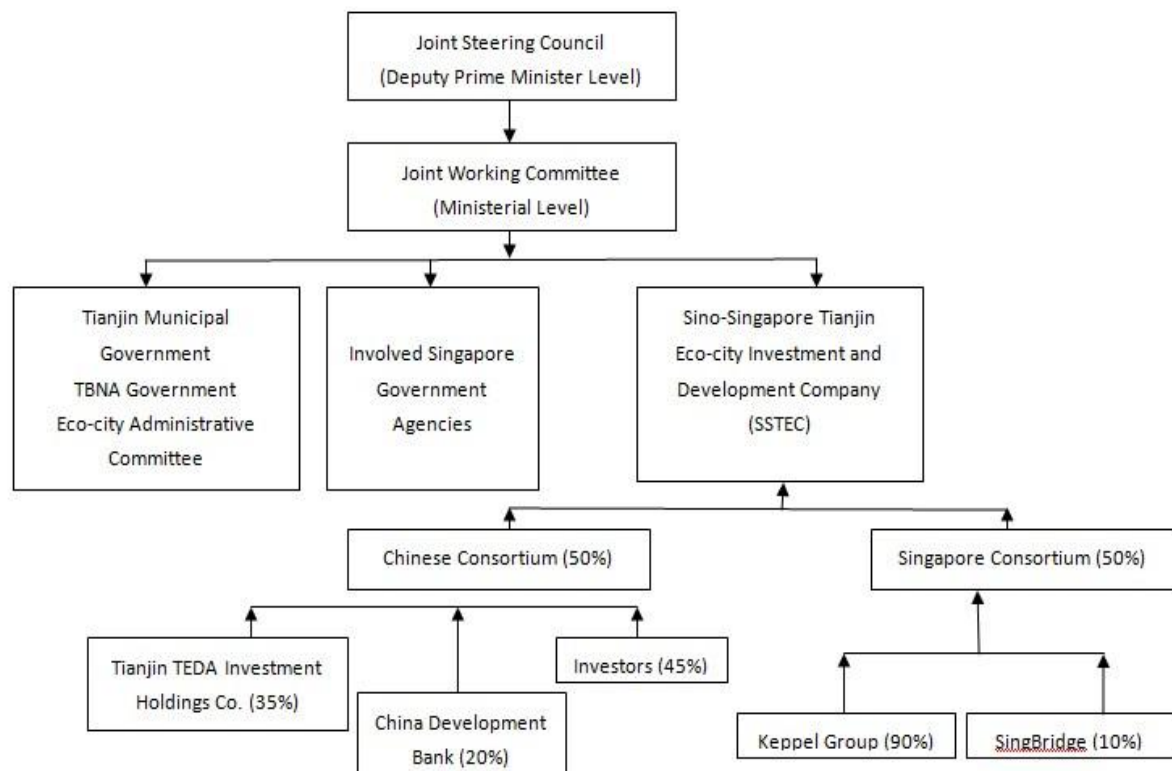


Fig. 3 Organizational structure of SSTECH (picture by author)

As is reflected in the organizational arrangement of SSTECH, there is strong *involvement of leaders* from both sides. The Joint Steering Council and Joint Working Committee chaired by top-ranking officials showed the *clarity* of the organization and bilateral communication. Various Chinese and Singaporean government agencies are also organized to further promote the project in their different expertise areas. They can be identified as the alliance of *promoters* for SSTECH project. Such an institutional structure will be conducive for the cross-sector collaboration which is essential for the development of SSTECH. Intensive cooperation is also organized at lower levels where a variety of both public and private parties come into play.

SSTECH has also established partnership network with other players. In 2009, SSTECH signed a MoU with several companies mainly engaged in real estate development including Ayala Land from the Philippines, Farglory from Taiwan, Keppel Land and Tiong Seng from Singapore (Briomedia Green 2012). An Eco-Business Park was planned in the city by Ascendas, one of Singapore's major business solutions space providers. The park is designed to attract international companies with a particular interest in energy and environmental issues. Another green technology center was also proposed among other partners including China's leading foreign-funded property developer Shimao Property Holdings, Japan largest real estate developer Mitsui Fudosan Co., Ltd and Shanghai Broadway Packaging & Insulation Material Co., Ltd (Alusi et al. 2011). In addition, many technology companies are also involved in SSTECH's strategic partnerships. Philips, Hitachi Samsung and Singapore Technologies Electronics Limited, etc will work on reducing the city's energy consumption based on their expertise domain. Another important ingredient in the sustainability agenda of SSTECH is the establishment of a new university offering master and doctoral degree programs in sustainable design, which makes education on sustainability an essential part of the initiative. The extensive partnership network SSTECH has built up also helps to strengthen the collaboration. Moreover, social equity issues are also taken into consideration in SSTECH. At least 20% of affordable housing supply is clearly stated in the KPIs as one of its social sustainability goals (Government of Singapore 2008). Though local citizens are not organized to directly participate in the planning phase, their interests and were given weight to and reflected in the master plan. Thus social inclusion in SSTECH marks its efforts in inclusion of actors and the pursuit for comprehensive sustainable urbanization. However, it should be noted that there may be certain obstacles ahead for the "goodwill" to come true due to the short-term political representation. Local officials usually have just a few years' tenure of office, so they may not necessarily prioritize the long-term project in the same way as their Singaporean counterpart. In this case, since Tianjin Eco-city

Administrative Committee doesn't correspond to any district government, the complex dependencies on related government authorities may incur more frictions when it comes to implementation. The top level support may not guarantee a successful execution down to the local level, therefore to understand the underlying interests of related governments and to establish effective checks and balances among the many authorities involved would be of utter importance for the development of SSTECH. The complexity of related authorities at different levels can give a rough idea of the weight the factors of **"disparity of hierarchical structure"** and **"power position"** have in the case of SSTECH. The challenge here is not just for the Singapore side, but more importantly, for Tianjin Eco-city Administrative Committee and the JV. With many government agencies at stake, how to avoid being restricted by the intricate dependencies upon them and exercise its granted authority effectively can be a trial for both of them. Furthermore, SSTECH's complex partnership between private and public sectors across geographical borders and jurisdictional boundaries also raise the concern of how to balance the commercial and social aspects of the eco-city. The strong commercial pressure in economic and real estate developments from private entities will challenge the public interests and prevailing eco-objectives in the project, making it a constant stretch for SSTECH to strike a balance and achieve its environmental and social harmony goals.

### 3.2.5. Political support

Except for the strong involvement of various government agencies which is clearly presented in its organizational structure, SSTECH also enjoys unique preferential policy and government incentives. The prestige from government-to-government cooperation has gained SSTECH favorable investment incentives such as flexible foreign exchange settlement, tax rebate, operational subsidy and HR support. SSTECH is the first and only region in China to enjoy the voluntary foreign exchange settlement policy, which would make Singaporean investors less vulnerable to fluctuating exchange rates(Liu 2011). In January 2011, International Enterprise (IE) Singapore, an agency under the Ministry of Trade launched an Tianjin Eco-city Assistance Programme (TAP) to boost Singapore-based companies' participation and investment in the area(IE Singapore 2011). Recently in March 2012, IE Singapore has announced that a new incentive programme for Tianjin Eco-city would be rolled out in addition to the earlier TAP. IE Singapore will provide \$9.5 million in the following five years to help eligible Singapore companies interested in investing in SSTECH(Singapore Government 2012). Such incentive policies from both sides would make SSTECH a highly attractive and stable platform for Singapore companies to come and establish their business presence in China.

### 3.2.6. Progress and results

Since the groundbreaking ceremony in September 2008, SSTECH has been proceeding steadily. Much of the saline and non-arable area has been turned into land with green buildings and roads with wind and solar energy powered street lights. During Singapore's Senior Minister Mr Goh's official visit to SSTECH in April 2011, he described the progress as "truly amazing"(ABN Newswire 2011). As a matter of fact, in less than a year Tianjin Eco-city has evolved from a concept to a fully activated project. The fast-track development of SSTECH can be best explained by Singapore's stable **political relation** and **economic connections** with China. While it is so common that many planned projects remain mired in bureaucratic standstill, SSTECH quickly proceeded with green lights all the way at a remarkable speed. The previous collaboration in SIP and continued bilateral government dialogues have strengthened political and economic ties between China and Singapore, which contributed to SSTECH's fast development.

In March 2012 the first wave of residents has moved into SSTECH, and more residential projects will be due for completion by the end of the year. By then about 6,000 families will be able to move in their new homes. With these new residents, SSTECH is entering a new phase of development with part of actual materialization of its plan. The National Animation Industry Park in SSTECH has started operation since August 2011, and an international school with a focus on environmental protection is reported to begin operation in the coming September. Green businesses and IT industries are also expected to come into place with the ready built factories being available now(Siow 2012).

Though SSTECH is considered by many as the most promising eco-city project in China, it still faces growing competition right at its doorstep. An Eco Nanhe Town project in Tianjin led by an Italian group was initiated in February 2011. Situated on a 13 km<sup>2</sup> site in the district of Tianjin Xiqing, Eco Nanhe Town intends to build a community together with a science park and commercial facilities for 75,000 residents in Tianjin. The municipality of Nanhe Jingwu launched a competition for new city development in May 2008. Later in August the Italian draft of AM Progetti emerged as the winner out of other Chinese, American, Spanish and Australian competitors(AM Progetti 2008 ). This is one example of the local officials tying up with international private-sector partners in urban development across China, as competition for investments has become a reality any Chinese city has to face. SSTECH's official has expressed their undaunted attitude and welcome such competition "to keep us on our toes"(The Business Times 2011)

### **3.2.7. Identified critical success factors in collaboration**

Based on the case study on Sino-Singapore Tianjin Eco-city above, the critical success factors can be identified as stable political relations, close economic connections, strong resource interdependencies, capacity potential (for TBNA), involvement of leaders at both national level and local level, various government agencies as promoters, clear organizational structure, strong political support in the form of preferential policies, and relatively balanced power positions of collaborating parties. The negative or insufficient factors that may pose a threat to the collaboration can be disparity of hierarchical structures given the multiple levels of government authorities in TBNA area, and potentially the competition in neighboring area (Eco Nanhe Town project).

## **3.3. Sino-Singapore Guangzhou Knowledge City (SSGKC)**

### **3.3.1. Introduction**

When Guangdong's Party Secretary Wang Yang visited Singapore in September 2008, he expressed the intention to strengthen the cooperation between Singapore and Guangdong in economic restructuring during the next development phase of Guangdong. As a response, in February Singapore's Senior Minister of State for Education and Information, Communications and the Arts, Lui Tuck Yew led a business delegation consisting of 37 Singapore enterprises in different industries to Guangdong province. Under IE Singapore's arrangements, Singapore delegation visited four Guangdong cities including Guangzhou, Shenzhen, Dongguan and Foshan and had discussions with high-level officials from the four cities and Guangdong's Party Secretary Wang Yang (ChannelNewsAsia 2009). As a follow-up to Party Secretary Wang Yang's visit in 2008, the visit aimed to examine the latest development in Guangdong cities and have a cleared vision of how Singapore can participate in Guangdong's economic restructure and industrial upgrading. After the trip, the idea of building a knowledge city in the provincial capital of Guangdong was proposed by Keppel Corporation and was readily accepted by the Guangdong provincial government. Initially through its special-purposed vehicle Knowledge City Pte., Ltd, Keppel Corporation has signed a Memorandum of Understanding (MOU) with Guangzhou Development District Administrative Committee for a feasibility study on joint development of Guangzhou Knowledge City. Later Keppel Corporation's stake in the Guangzhou Knowledge City project was taken over by Temasek Holdings in 2009. Subsequently SingBridge International Singapore, the subsidiary company of Temasek Holdings, conducted the feasibility study jointly with Guangzhou Development District (GDD) to identify target



industry sectors.

Guided by the idea of “attracting top talent, gathering high-value industries and providing high-end services”, Guangzhou Knowledge City strives to become a new growth engine of Guangdong and even China’s high-end industries. SSGKC has an ambitious development strategy which depicts a three-in-one city: smart city, eco-city and learning city(Wang 2012). In the development plan of SSGKC, six central fields are distinguished: lifestyle, transport, government administration, ecology, learning and medical care. An 19-indicator system covering eco-environment, water system, sanitation and waste system, and new energy resources is established to measure and evaluate the city performance(Invest Guangzhou 2012). Guangzhou Knowledge City set up clear goals both in terms of vibrant economic growth through industrial restructuring, and eco-friendly living conditions under careful urban planning. Eight pillar industries have been identified for the new city, namely energy and environmental technology, IT Convergence, biotechnology and pharmaceuticals, R&D services, creative industries, advanced manufacturing, education and training , health and wellness(Singbridge International 2010). Similar with the case of Suzhou Industrial Park, advanced software including policies, processes and methods to plan, develop and manage a city has been recognized as a crucial part of the initiative that distinguished itself as a world-class city development project. Intensive software co-operations were also emphasized in order to attract knowledge-based industries and talent to meet the growth demands of Guangzhou Knowledge City.

Guangzhou Knowledge City sits on a 123 km<sup>2</sup> greenfield land that is 35 km from the center of Guangzhou City. It is located in the Jiulong Town in Luogang District, which belongs to the key construction projects of science town promulgated by the State Council of China in “The Outline of the Plan for the Reform and Development of the Pearl River Delta (2008-2020)”. Half of the site’s green space would be preserved in an eco-friendly, leaving another half of 60 km<sup>2</sup> land to be developed. The projected population in Guangzhou Knowledge City will be 500,000, half of which will be employed workforce. With the commitment from Guangzhou municipal government in infrastructure development and extension, Guangzhou Knowledge City is expected to be accessible with fast rail from Shenzhen in 45 minutes, and only 15 minutes away from Guangzhou Baiyun International Airport(SingBridge 2012). On June 30, 2010 the groundbreaking ceremony was held in Guangzhou with the attendance of Singapore’s Senior Minister Goh Chok Tong, and the Member of Political Bureau of the CPC Central Committee and Guangdong CPC Secretary Wang Yang.

The construction of Guangdong Knowledge City is divided into three stages. The first stage (2010-2015) will focus on a start-up area of 10 km<sup>2</sup>. The targets during this period include the creation of a complete innovation system and livable community environment, the move-in of about 500 innovative enterprises and a regional gross product of 30 billion RMB. The following years from 2015 to 2020 will be an accelerated development period covering roughly 30 km<sup>2</sup> of land, with a projected regional gross product of 100 billion RMB. The years beyond 2020 will be the thriving period of the knowledge city, which will be marching towards a regional gross product of 300 billion RMB and the gradual completion of construction and development (SSGKC 2011).

### 3.3.2. Economic and political background

Guangdong and Singapore has strong and stable economic relations. A series of numbers can give a clear illustration of their bilateral economic connections. Guangdong is Singapore's top provincial trading partner and second largest investment destination (SG Press Center 2010). Singapore ranks the fifth largest foreign investor of Guangdong. Guangdong in turn has an active presence in Singapore. Among 150 Chinese companies listed on Singapore Exchange, 26 are based in Guangdong (Singapore Government 2009). In 2008 the China-Singapore Free Trade Agreement was concluded, marking another important milestone in the bilateral economic cooperation. It is the first FTA China has established with an Asian country, and the significance goes beyond symbolic achievement. Guangdong shows direct benefit from the FTA with an 8.9% growth of total bilateral trade in 2010. In the following quarter from January to April, according to the report by IE Singapore, the actual FDI from Singapore into Guangdong amounted to US\$80 million in 28 projects. These concrete and striking figures vividly depict the strong **economic connections** between Singapore and Guangdong, which laid a solid foundation for their collaboration on Guangzhou Knowledge City.

Based on this economic rationality and geographical adjacency, Singapore and Guangdong also have frequent reciprocal visits of leaders. The collaboration for GKC just originates from Guangdong Party Secretary's official visit in Singapore in 2008. It can be argued that the local level **political relations** are based on the stable political diplomacy between Singapore and China, the intensive economic connections, the geographical and cultural adjacency between Singapore and Guangdong. The long track of history in trading and cultural exchange between Singapore and Guangdong made them quite familiar with each other when it comes to economic collaboration. It is this long-developed **trust** that brings them together in GKC and

drives the project on a fast-track development rail. Singapore's previous strategic collaboration projects with China in SIP and SSTECH also have the political heritage for GKC in gaining the support from national government and accelerating the development speed of GKC.

### **3.3.3. Goals and resources of key collaborating parties**

Unlike the preceding Sino-Singapore national level collaboration projects of SIP and SSTECH, Guangzhou Knowledge City originated from Guangzhou municipal government's intention to learn about Singapore's experience in upgrading its industrial structure and attract talents and skilled workforce. Being entitled as the threshold of Marine Silk Road, Guangzhou is one of the most important trade ports in China. It has a long track of history of trade and economic exchange with foreign countries, especially Asian nations and regions. During the past three decades, it has served as a development engine which helped to stir China's economic growth. However, the heavy reliance on manufacturing sector has taken a toll: with the increasing labor and material costs and the appreciation pressure of Renminbi, Guangdong has become more vulnerable to the volatility of foreign markets. The bitter experience during the economic crisis forced Guangdong to reconsider its industrial structure and strive to move up the value chain for survival.

Against such a backdrop, Guangdong sought for collaboration opportunities on economic restructuring with its neighboring country-Singapore. Singapore's experience from two former high-profile co-operation projects on Suzhou Industrial Park (SIP) and Sino-Singapore Tianjin Eco-city (SSTECH), and its intensive economic connections in Guangdong made Singapore the ideal international partner for Guangdong to realize its strategic vision. As is pointed by Singapore's Senior Minister Mr. Goh Chok Tong, Singapore could provide the necessary capital, technology, advanced services and ideas for Guangdong's new round of economic restructuring and reform(Singapore Government 2009). Currently there are already more than 1000 Singapore companies having a presence in Guangdong Province(ChannelNewsAsia 2009). With Guangdong's economic transformation up the value chain, more Singaporean companies are expected to come and explore emerging opportunities in high-tech industries and talent development.

For Singapore, Guangzhou Knowledge City is a progression of the two previous top-level collaboration projects of SIP and SSTECH between China and Singapore. Guangzhou Knowledge City will also allow Singapore to strengthen its foothold in Southern China and enrich its collaborative project portfolio in China's important development zones. Guangdong has been the traditional test bed for new ideas and programmes. Its success marked by an a compound

annual growth rate of over 19% for the past three decades has impressed the world and proved the eminent position of Guangdong in China's economy. In previous government-to-government collaborations, Chinese national government preferred to use Singapore's help in other relatively less developed provinces where they could make a bigger impact. Now with the invitation from Guangdong and its strategic industrial upgrade agenda, Singapore could seize the opportunity and strengthen the economic linkages with Guangdong in high-tech and green industries. By injecting fresh growth momentum into Guangdong, Singapore could leverage on the prospective opportunities unfolded during Guangdong's movement up the economic ladder and better capitalize on its geographical, historical and economic links in Guangdong.

It is clear that there exist intensive ***resource interdependencies*** between Singapore and Guangdong. The economic restructuring theme is clearly embraced by both sides with the recognition of shared interests and mutual opportunities. Their goals and expectations converge into the forecast of new economic areas in high-tech and green industries. The profound economic, historical and cultural linkages between Guangdong and Singapore give them rich contextual knowledge about each other, thus ensuring the ***match of expectations*** from both sides.

### **3.3.4. Institutional arrangement**

There was a change of the leading Singaporean party in the early planning phase of SSGKC. Initially Keppel Corporation was involved in the Guangzhou Knowledge City project; later Temasek Holdings took over Keppel Corporation's stake in the project and finished the feasibility study together with Guangzhou Development District (GDD). As Singapore's Senior Minister Goh Chok Tong explained, Keppel Corporation was at that time already occupied in SSTECH and had made considerable investments there. Keppel Corporation as a public company had to answer to its shareholders who were impatient for immediate returns on investment. Again, Singapore government's rich resources and instruments filled in the gap and transferred Keppel's stake to another key state-owned holding company Temasek Holdings. Noticeably, Temasek Holdings Pte., Ltd is an investment company 100% owned by the Singapore government. Founded in June 1974, Temasek Holdings has a long history of supporting the Singapore government's long-term policies by partnering with private companies in the overseas investment and by deploying its companies based on the regionalization strategy (Yeung 2003). Thus compared to Keppel Corporation, Temasek Holdings could take a longer view for strategic projects like SSGKC.

With the Singapore investment partner on board, in November 2010 a 50/50 joint venture named Sino-Singapore Guangzhou Knowledge City Investment & Development Co., Ltd has been set up between Temasek Holdings's subsidiary company SingBridge International Singapore Pte., Ltd, and Guangzhou Knowledge City Investment and Development Co.,Ltd wholly owned by Guangdong Development District Administrative Committee(SSGKC 2011). The joint venture will be the master developer of the Guangzhou Knowledge City. SingBridge had planned to invest 2 billion RMB (\$412 million) in the venture, while Guangdong Development District would contribute a 123 km<sup>2</sup> tract of land and be responsible for the infrastructure investment connecting the knowledge city with the rest of the province(iProperty 2010). In addition, the Guangzhou municipality government also established a Sino-Singapore Guangzhou Knowledge City Administrative Committee (KCAC) to exercise province-level authority in administration and economic management. KCAC is entrusted with the responsibilities of formulation and implementation of investment preferential policies and management of social affairs, administration of land use rights and construction permits, infrastructure development and environment protection in GKC Projects(SSGKC 2011). The organizational structure for SSGKC is illustrated in Fig.4 below. By June 2010, the master plan for the entire Knowledge City was completed by the Singapore-based company RSP Architects Planners & Engineers Pet., Ltd(Singbridge International 2010).

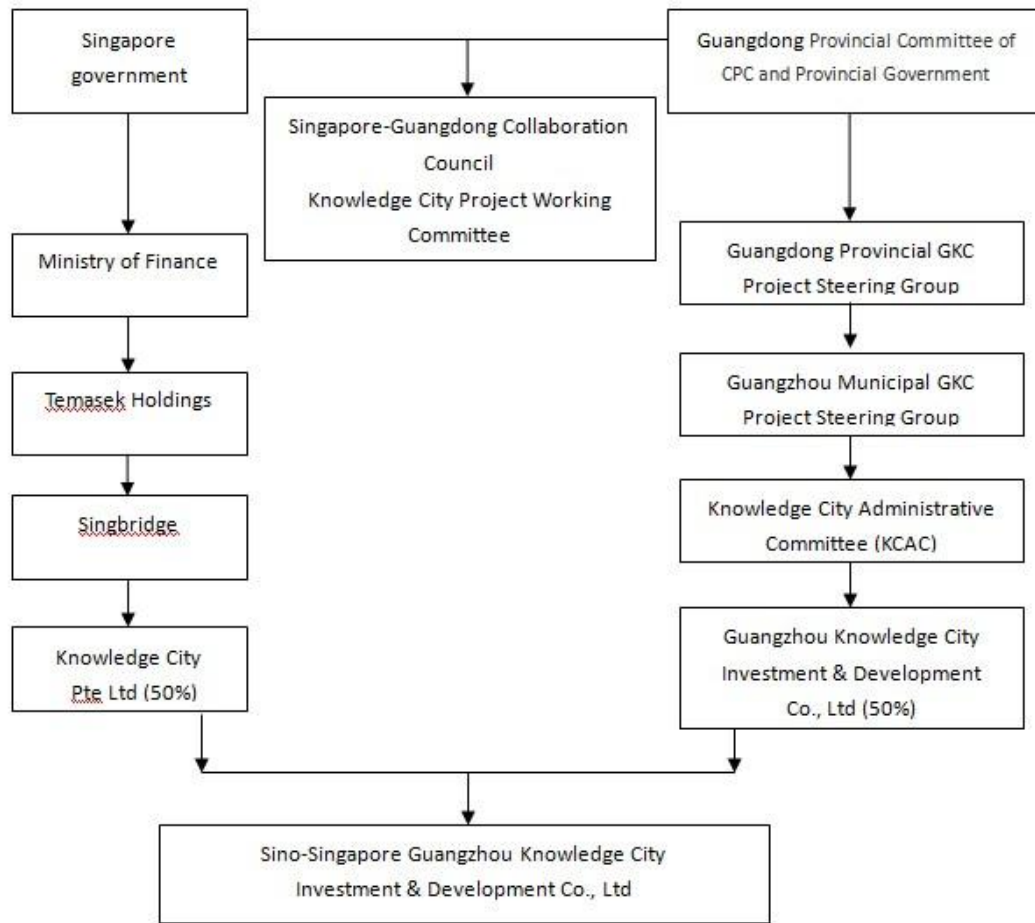


Fig. 4 Organizational structure of SSGKC (picture by author)

Prior to the establishment of JV for GKC, a Singapore-Guangdong Collaboration Council (SGCC) was inaugurated in March 2009 to further promote the economic collaboration, cultural exchange and talent training and development between Singapore and Guangdong. SGCC is co-chaired by Singapore's Senior Minister of State (SMS) for Education and Information, Communications & the Arts, and the Vice Governor of Guangdong (IE Singapore 2009). Annual meetings have been scheduled for SGCC to discuss Singapore and Guangdong's collaboration areas in urban solutions, port operations and logistics, education, environmental services, and infrastructure services, etc. SGCC will contribute to the promotion and coordination of Guangzhou Knowledge City project by forming a Knowledge City Working Committee chaired by the assistant CEO of IE Singapore and Director-General of Guangdong Foreign Affairs Office (SG Press Center 2011). Based on the organizational structure, it can be concluded that SSGKC operates in an "enterprise-driven, government-promoted, market-based" mode. It is clear that there is close *involvement of leaders* from both Singapore government and Guangdong Province in a *clear* institutional arrangement, which signifies the commitment

from both sides in GKC project. Singapore-Guangdong Collaboration Council, together with Guangdong provincial and Guangzhou Municipal steering group act as the ***promoters*** for GKC. Strong and visionary leadership as an important aspect of collaboration thus can be observed in GKC project. As a commercially-driven initiative, there are also relatively balanced ***power positions*** between Guangdong and Singapore. Guangdong Province has the administrative capacity and economic resources to be an autonomous partner in the collaboration without too much reliance on the central government. As a traditional test bed for new ideas and programmes of China, Guangdong enjoys incomparable autonomy in contrast to most Chinese provinces. Singapore has recognized that and placed Guangdong in an equal position to have open and direct dialogues. Maybe Singapore's experience in SIP also helped it to put a stronger focus on the local level cooperation and communication. Additionally, collaborating with Guangdong directly also eased the difficulties brought by ***disparity of hierarchical structures*** of cooperating parties. As can be seen from the organizational structure of SSGKC, the two sides have roughly symmetrical layers of authorities and companies. Collaborating with Guangdong directly without the mediation of central government relieves Singapore from the intricacies brought by China's complex fragmented authoritarian issues. Therefore both sides are able to better focus on the project within the local arena.

In terms of inclusion of actors, SSGKC has also set up extensive collaborations have been set up with a wide range of participating parties from both sides under 17 different themes(SingBridge International 2011). Among those, there are MoUs on urban design for start-up area with the engagement of RSP, Guangzhou Development District Administrative Committee and Singbridge International; for the development of green buildings and sustainable developments, BCA International Pte Ltd (BCAI) is involved along with the master developer of Guangzhou Development District Administrative Committee and Singbridge International. Other participating parties include Guangzhou Economic and Technological Development District Administrative Committee, International Enterprise Singapore (IES), IDA International, Ascendas Land International Pte Ltd, National University of Singapore (NUS) Business School, Nanyang Technological University (NTU), etc(SingBridge International 2011). The active participation of both Chinese and Singaporean companies and institutes may in turn verify the existing intensive ***economic connections*** between Guangdong and Singapore and resonates with the commercially-driven nature of the collaboration.

### **3.3.5. Political support**

On the national government level, both China's Vice-Premier Wang Qishan and Singapore's then Deputy Prime Minister Wong Kan Seng have pledged support to the

development of GKC. The provincial level administrative authority in city planning, investment, construction and foreign finance control granted to Guangzhou Knowledge City Administrative Committee clearly reflects the full commitment of Guangdong(Guangzhou International 2010).

### **3.3.6. Progress and results**

Guangzhou Knowledge City has been proceeding smoothly since the groundbreaking in June 2010. According to the report on the official website of SSGKC, by 2011 nearly 70 investment agreements have been signed with companies from America, Europe, Japan, Singapore, Korea, etc with a total investment of 37 billion RMB(SSGKC 2011). Much progress has also been achieved in software collaboration: so far 4 software training and 5 software co-operation projects in urban design, drinkable water supply, e-government and social management have been launched(SingBridge 2012). In 2012, the construction of SSGKC will be fully activated: as the "enterprise-driven" vehicle, the joint venture will focus on the software cooperation and the achievement of 12 key target performance indicators which includes the initiation of Ascendas OneHub GKC, finishing 60% of the road and water line construction in the start-up area, the completion of overall planning of eco-city, and the formulation of the three-year software cooperation plan(GKC Project Office 2012). April 22, 2012 is another important milestone for SSGKC: the "Overall Conceptual Plan for Building Sino-Singapore Guangzhou Knowledge City (GKC) into an Intelligent City" (the "Plan") has passed the inspection and was accepted by the expert panel(Luogang District 2012), marking an important step forward for SSGKC.

It is also quite eye-catching that Singapore's three higher education institutions including National University of Singapore (NUS) Business School, Nanyang Technological University (NTU) and Nanyang Polytechnic (Singapore) have actively participated in Guangdong Knowledge City. Take the example of NTU, who plans to build an NTU Innovation Base in SSGKC with three programs in different directions: innovation research, graduate-level education and short-term executive training for Chinese senior officials. In comparison, Nanyang Polytechnic would set up a Professional Training and Assessment Base focusing on enterprise-oriented workforce training(SingBridge International 2011). The focus divisions among these Singaporean education and research institutes in SSGKC will pre-empt the higher education and training market there in Guangzhou, as well as generate greater synergy in promoting the blossoming knowledge industry in SSGKC.

### **3.3.7. Identified critical success factors in collaboration**

Based on the case study on Sino-Singapore Guangzhou Knowledge City above, the critical



success factors can be identified as stable political relations, close economic connections, strong resource interdependencies , capacity potential), long-built trust in previous interactions, involvement of leaders at both national level and local level, various government agencies as promoters, clear organizational structure, strong political support of in the form of provincial level administrative authority granted to Guangzhou Knowledge City Administrative Committee, and relatively balanced power positions of collaborating parties.

### **3.4. Features of Sino-Singapore collaboration**

#### **3.4.1. Two-level supervisory framework**

The most distinguishing feature of the Suzhou Industrial Park and Sino-Singapore Tianjin Eco-city is the degree of political support they received and the strategic purpose they served. In other words, it is the intention to strengthen the cooperation between the two nations that give birth to the two collaboration projects at different points along the time continuum. For this reason, both Chinese and Singapore governments intend not only to create the right conditions for the projects to take off, but to establish an official supervisory mechanism which guarantees the viability and success of bilateral collaboration in these projects. The significance of these projects go beyond achieving the goals established at the beginning for each collaboration, but more importantly, to develop a sustained and fruitful cooperation mechanism between the two countries beneficial for both in the long term.

Such a feature is reflected in the two-level supervisory mechanism consisting of a Joint Steering Committee (JSC) and a Joint Working Committee in the organizational arrangement. Consisting of heads from relevant ministries and government agencies, JSC represents the highest level of commitment in the project. JSC assumes the responsibility of overseeing major issues in the project. The ministerial level Joint Working Committee serves as the interface between local authority of project administrative committee, JV and JSC. It consists of officials from related ministries and local government officials. Thus the supervisory structure is interwoven with both Chinese and Singaporean officials from different sectors on the horizontal dimension while having a clear chain of command on the vertical dimension. Regular meetings are scheduled for both JSC and JWC to review the progress of projects and discuss problems surfaced during the course. The rather formal two-level supervisory board is characterized by mutual commitment and close interactions between involved parties.

Guangzhou Knowledge City has obviously drawn on the experience of SIP and SSTECH. Though there is no direct involvement of central government in this collaboration, Guangdong provincial government acts as the counterpart of Singapore government. Similar with the

two-level supervisory mechanism, Singapore and Guangdong established a Sino-Guangdong Collaboration Council and the Knowledge City Project Working Committee under it. Sino-Guangzhou Collaboration Council is not specially set up for this project and promotes bilateral collaboration in a wider spectrum of areas. As Guangzhou Knowledge City is an important component of Sino-Guangzhou collaboration, a Knowledge City Project Working Committee was established. Different from SIP and SSTECH, the two supervisory boards here assume more consultation roles instead of direct control over the JV. Again this has to do with the commercially driven nature of the project and its purpose of economic structure upgrading. It can be inferred that the previous experience in Sino-Singapore collaboration projects has set an example for this project, evidenced by the inheritance of two-level supervisory framework and a JV as master developer which is discussed in the next point.

### **3.4.2. Consortium-based JVs as master developer**

Another striking characteristic shared by all three projects are the consortium-based JVs they established. Furthermore, in SSTECH and GKC the Singapore consortiums have 50% stake in the JV and share equal control with their Chinese counterparts. In SIP the initial stake of Singapore consortium was even higher as 65%, though later they lowered their share to 28% for now. These consortium-based JVs with a large share strongly embody the confidence and commitment from Singapore. These JVs are the master developers of these projects, whose revenue mainly come from the real estate development. Though the reliance on real estate market is observed across almost all Chinese eco-city project, Singaporean companies are the only international partners who really take an interest in China's real estate development and make heavy investments in these projects. The long-term ROI of real estate investment pose quite a challenge to most publicly listed companies who have to answer for their impatient shareholders. And that relates to the dominance of government-influenced companies in both Chinese and Singaporean consortiums and thus brings us to the third feature next.

### **3.4.3. Government-owned or government-linked enterprises as instruments**

In Sino-Singapore collaborations, government-owned or government-linked enterprises are the most potent instruments and spearheaded in the formation of consortiums. In all Sino-foreign eco-city projects the Chinese side is always represented by a government-owned urban development investment company (UDIC), which is a common practice in China. Since Chinese local governments are limited in the amount of loans from banks, these UDICs borrow loans from the bank more freely on behalf of local governments and are usually more than welcomed by banks. What is eye-catching in Sino-Singapore collaborations is the strong

presence of Singapore's government-linked companies. Keppel Group is the leading company in both SIP and SSTECH, and it was once attached to the Temasek Holdings - a wholly state-owned investment company which is also the leading company in Singaporean consortium in the Guangzhou Knowledge City project. It is these government-influenced companies who have the capacity and resources to become partner investors in Sino-Singapore collaborations and allow both sides to pursue their long-term strategic visions. With collaboration platforms underpinned by these government-owned or government-linked companies, private companies are assured and supported to get on board in the JVs. The presence of government-influenced companies laid the foundations for the collaborations and attracted private sectors to join and to build up public-private partnerships in these projects.

#### **3.4.4. Package solutions offered by Singapore**

JVs set the ambitions high, but there are sufficient reasons for that. Except for the direct investment, Singapore has more resources on the table. In the case of SIP and SSGKC, Singapore offered the software transfer programme which aims to help the local partners improve their management policies, processes and methods. In SSTECH, multiple government agencies, companies and institutes in different expertise areas of urban development including urban planning and environmental technologies are all involved and prepared to make their own contributions to the project. With Singapore as the bilateral collaboration partner, Chinese local governments can spare the efforts of reaching out for more assistances or resources needed in their projects. Singapore's international orientation also helps to bring in more foreign parties in these initiatives and develop a network of partnerships to make the project a success.

#### **3.4.5. Active participation of Singaporean knowledge institutes**

Singapore's education and research institutes have an active presence in Sino-Singapore collaboration projects. The participation of three Singapore universities in Guangzhou Knowledge City is most impressive. The emphasis on knowledge transfer as is indicated in the title of "Guangzhou Knowledge City" provides quite an opportunity for Singaporean knowledge institutes to make a contribution in terms of talent tool development. Moreover, in Sino-Singapore Tianjin Eco-city, Singapore's National University of Singapore also partnered with Tianjin Municipal Education Commission (TMEC) and Sino-Singapore Tianjin Eco-City Administrative Committee to establish a college in SSTECH offering high-quality and research and graduate programmes. Even in Suzhou Industrial Park the National University of Singapore (NUS) recently set up a research institute focusing on finance, water and environmental

sustainability issues that are relevant for SIP. It is also expected that the institute will become an incubator for NUS and Singaporean start-up companies to thrive in close cooperation with their Chinese partners. The engagement of Singapore's prestigious universities may again show the abundant resources Singapore could bring into these collaborations.

## 4. Sino-Swedish collaborations

### 4.1. Caofeidian International Eco-city (CIE)

#### 4.1.1. Introduction

Facing the increasing demand for housing and urban services, the Tangshan municipal government decided to develop another residential city in Caofeidian area as a sub-center of Tangshan. Since Tangshan used to rely on heavy industries which caused considerable expense of natural resource exploitation and pollution, Tangshan municipal government seeks a new urban development model towards a more sustainable and livable city. Given the alluvial area in Caofeidian area, the vision of building an eco-city compatible with industrial development emerged as the solution.

Prior to the initiation of the project, Tangshan municipal government commissioned a feasibility research named “Strategic Planning of Southern Coastal Area of Tangshan” in 2006 by Tsinghua Urban Planning and Design Institute, Chinese Academy of Urban Planning and Design, Shenzhen Urban Planning and Design Institute. The strategic research has intensively investigated the conditions of Caofeidian area and confirmed the conception of a coastal eco-city(Qiang 2009). In order to ensure high-quality planning from the beginning, an international competition has been held for the master plan of Caofeidian International Eco-city in December 2007. Many prominent design and planning firms including Arup from Britain, EDAW from the U.S, DHV from Holland, ArchA from Italy, Sweco from Sweden, China’s Urban Planning and Design Academy, and Tsinghua Urban Planning and Design Institute had joined the first round of conceptual plan for Caofeidian International Eco-city. After the initial assessment, both SWECO and Tsinghua Urban Planning and Design Institute entered the second round in April 2008 and were invited to jointly develop the concept planning for Caofeidian Eco-city(Qiang 2009).

Caofeidian International Eco-city is 80 km from the city center of Tangshan, and 220 km from Beijing. With a starting area of 12 km<sup>2</sup>, Caofeidian Eco-city is expected to accommodate 160,000 people by 2015. The total planned urban construction land amounts to 150 km<sup>2</sup> with a projected population of 1.5 million(BaiduBaike 2011) Caofeidian International Eco-city is planned to be a world-class, people-focused sustainable city. It aims to achieve ecological, economic and social sustainability, while clearly establishing the goal of climate neutrality. It intends to become a flexible, accessible, resource- and cost-effective city(Sweco 2009). In

order to systematically articulate its vision towards an eco-city, nine major themes have been formulated in Caofeidian International Eco-city: to create a livable, innovative, accessible, green and blue, climate neutral, resource efficient, flexible, beautiful and healthy city. Caofeidian Eco-city is also characterized with notable features including the choice of wasteland, 90% green transport, at least 50% water from non-traditional sources, and more than 50% renewable energy and waste heat supply(The World Bank 2009). Like Sino-Singapore Tianjin Eco-city, the proportion of at least 20% of affordable housing is also stated in its development plan and thus taking social inclusion issues into account.

The development of Caofeidian International Eco-city is divided into three phases. Phase I (2008-2010) will be an accelerated infrastructure construction period focusing on the 12 km<sup>2</sup> starting area. It is guided by the vision of creating a coastal city to boost the development of the harbor area and is targeted to accommodate 60,000 inhabitants. The following Phase II will build up an exemplary eco-city construction site within the 74.3 km<sup>2</sup> area, which would be the model for the central city of southern Tangshan. By 2020, a population of 800,000 is expected to move in the eco-city. The eventual goal for Caofeidian Eco-city is to develop into a city of 150 km<sup>2</sup> area with 1 million residents. Phase III of the years beyond 2020 will finalize all the planned construction work and consummate the city functions(INTECOPOLIS 2008).

#### **4.1.2. Economic and political background**

The economic ties between China and Sweden have been growing steadily since the establishment of their diplomatic relations. During the 1990s, China and Sweden's trade relations entered a new stage of rapid development. In January 2007 during the visit of China's then Minister of Commerce Bo Xilai in Sweden, a Sino Sweden Agreement on Economic, Industrial and Technical Cooperation was signed, marking a new level of economic cooperation between the two sides(Chinese Embassy 2007). Most recently, China has decided to provide a 1 billion euros loan to Swedish small- and medium-sized enterprises (SMEs). Sweden's better performance compared to many European countries gives China the confidence to invest in the country(Zhao 2012). Currently China is Sweden's largest trading partner in Asia, and Sweden is in turn China's largest trading partner in Nordic Region. In 2011 the bilateral trade between China and Sweden stroke a record high of US\$ 13.7. The figure is expected to continue rising as the two countries have agreed to strengthen their *economic connections* by promoting closer collaboration in environmental protection and sustainable development(Xinhua 2012). Now China's 12<sup>th</sup> Five-Year Plan and the "Europe 2020"Strategy have opened a new window of

opportunity for both sides to deepen their cooperation in sustainable urbanization, energy conservation, GHG emissions reduction, and chemical and waste management.

China and Sweden also maintained stable **political relations** and have frequent high-level contacts and exchange of visits. After the Swedish King Carl XVI Gustaf's visit in China in 2006, Chinese President Hu Jintao paid a state visit in June 2007. In 2010 the two countries celebrated their 60th anniversary of diplomatic relations. The same year saw the establishment of a Nordic Confucius Institute in Sweden to further promote Sino-Swedish relationship. Most recently, Chinese Premier Wen Jiabao Premier paid an official visit to the Kingdom of Sweden in April 2012, it is the first official visit to Sweden by a Chinese Premier in 28 years. The increasing exchange of visits between the two countries signified the deepened bilateral relations along the way.

#### **4.1.3. Goals and resources of key collaborating parties**

Sweden is widely recognized for its experience in sustainable urban development and environmental protection with its world-class exemplary cities as Malmö and Hammarby Sjöstad in Stockholm. Sweden has managed to maintain a stable economic growth without the sacrifice of environment. With the increasing concern of environmental problems and climate change on a global scale, Sweden has sensed the opportunity of leveraging its experience in environmental technology to further boost its economic development. Sweden is particularly successful in waste, water and sewage treatment, renewable energy, energy efficiency and air purification (SWENTEC 2008). In addition, Sweden's expertise in sustainable community planning can also offer valuable experience for cities struggling with traditional industrialization and urbanization. Sweden's national level emphasis on environmental technology and green economy has also gathered various parties from different spheres including industry, academy, entrepreneurs and innovators in a close network.

China on the other hand, has placed sustainable development as a national development strategy and is ready to make investments to tackle environmental problems surfaced along the way of its traditional industrialization. For Swedish environmental technology companies engaged, China's market is full of enormous potential that's yet to be tapped. Against this backdrop, over the last decade Sweden has build up cooperation with China in sustainability field. Many Swedish companies have active presence in China, especially in business sectors like renewable energy and sustainable urban planning services. China has become Sweden's second-largest export market for environmental technology. In 2002, China and Sweden jointly presented the SymbioCity concept at the World Summit on Sustainable Development in South

Africa(Ulf Ranhagen et al. 2010). SymbioCity represents the Swedish interpretation of the eco-city concept and emphasizes on the integration of urban systems and the synergies generated. In 2008 the SymbioCity name and logo became registered trademark as a valuable asset administered by the Swedish Trade Council representing the Swedish approach to sustainable urban development. The bilateral cooperation between China and Sweden in green industry further gained momentum in 2007 when an environmental technology center, CENTEC was set up at the Swedish Embassy in Beijing. In 2008, the former Swedish State Secretary Mats Denninger was appointed as the Nordic country's special emissary for clean-tech cooperation with China, marking another important step forward in Sino-Swedish cooperation in environmental technology and urban development. During Sweden's Prime Minister Fredrik Reinfeldt's visit to China in April 2008, three important Sino-Swedish agreements including the Letter of Intent on Sustainable Urban Development Cooperation between the Swedish Ministry for Foreign Affairs and Ministry of Enterprise, Energy and Communications and Tangshan City were signed. Based on the letter of intent, later the Swedish consulate recommended Sweco to jointly develop the master plan for Caofeidian International Eco-city.

At the local level, Caofeidian also has the ideal conditions to become a start-point collaboration project between China and Sweden. Situated offshore in the southern part of Tangshan, Caofeidian used to be a dormant island in Tangshan Bay until the move-in of Capital Steel and Iron Corporation and the discovery of Nanpu oilfield in the 21st century. Consequently Caofeidian become a target national development area and in 2003 the construction of Caofeidian harbor was started. Since then, Caofeidian industrial area has attracted many industries to move their production plants there. There came along an urgent need to develop a residential city providing housing and public facilities for the people working there. Tangshan municipal government envisioned the new coastal city to be a sub-center of Tangshan. The drawbacks brought by traditional industrialization development mode are already quite obvious: the relative low life quality, wasteful use of resources, environmental pollution, deficient urban functions and the imbalanced population composition. With a determination to leapfrog into a new pattern of sustainable urban development, Tangshan municipal government actively look for international experience to assist the new city planning. Sweden's existing platform in sustainable technology CENTEC and its previous efforts in clean tech cooperation created the ideal condition for its participation in Caofeidian International City development.

It is clear that the **resources interdependencies** between Sweden and China prompted them to deepen collaboration in sustainability field, and in this case resulted in the Swedish



company Sweco's involvement in Caofeidian International Eco-city. Caofeidian's need for advanced international experience in sustainable urban planning and environmental technologies in city development corresponds to Swedish companies' expertise area in clean tech and urban planning services. The ***match of expectations*** between both sides in the collaboration is strongly characterized by supply and demand in terms of knowledge and technology. Furthermore, both Sweco and Caofeidian can benefit from the collaboration in intangible ways. By working collaboratively with Chinese experts in the project, they can accumulate valuable experience and contextual knowledge in China. With the experience and network of contacts developed in Caofeidian project, Sweco was able to establish itself as a competent urban design company and to explore more future collaboration opportunities in China. Caofeidian on the other hand, is also branded with the international element and has attracted the attention from national government, Sweden and even the world. Thus, ***capacity potential*** also becomes an important factor behind the collaboration.

#### **4.1.4. Institutional arrangement**

Tangshan municipal government is the initiator and owner of the Caofeidian International Eco-city. Investors for the project include Tangshan municipal government, Tangshan State-owned Asset Supervision and Administration Commission, and Tangshan Sun City Investment and Development Co., Ltd. Sweco, Vonion Investment Group and Tianjin Polytechnic University are involved as cooperation parties(EcoTech 2011).

Besides the involvement of Tangshan municipal government, the Industrial Zone of Tangshan, a Tangshan Bay Eco-city Administrative Committee was set up for to better support the development of Caofeidian eco-city. It consists of officials from the Tangshan Urban and Rural Planning Bureau and Caofeidian New Area Administrative Committee. However, Tangshan municipal government has realized that the achievement of Caofeidian Eco-city's target indicators partly relies on the coordination with surrounding areas including Caofeidian Industrial Area. In order to circumvent the troubles in cross-jurisdictional coordination, in March 2009 with the approval from Hebei Province, Caofeidian Eco-city was officially incorporated into the Caofeidian New Area together with Tanghai County and Nanpu Development Area, forming into a sub-city level government. Such a consolidation in regional authority is an example of innovation in government structure accommodating to the need of local development.

In the conceptual planning phase Sweco worked together with Tsinghua Urban Planning and Design Institute and was commissioned to undertake four tasks by the Administrative

Committee of Tangshan Caofeidian Industry Zone: develop sustainability guidelines for the first phase of a 30 km<sup>2</sup> carbon-neutral area and its physical conceptual planning to be completed in 2020; formulate conceptual detailed design for the 12 km<sup>2</sup> starting area; construct conceptual design for the Sustainability Center of Caofeidian Eco-city(Ranhagen 2008). The master plan jointly developed by Sweco and Tsinghua Urban Planning and Design Institute was approved by the Hebei provincial government in December 2008. After that, the task of detailed plan for the starting 12 km<sup>2</sup> was handed over to Tsinghua Urban Planning and Design Institute, while the rest 18 km<sup>2</sup> area in the northern part for Phase I was assigned to the China Architecture Design and Research Group. Meanwhile, EDAW from the U.S, DOW and DHV from the Netherlands, China State Construction International and Beijing Institute of Architectural Design were commissioned for the design and planning of a batch of projects including Binhai Avenue, municipal roads, information center, etc. The rough organizational structure is shown in Fig.6. At the end of 2009, a Swedish engineering company Skandinavisk Termoekonomi AB specializing in energy solutions set up a joint venture named Tengmao Energy Saving Technology Utilization Ltd with Caofeidian to develop a master plan for energy solutions in Caofeidian Eco-city(Andersson 2011). Except for the overall master-planning by Sweco, the collaboration between Caofeidian and Sweden also revolves around “Cities of Tomorrow” project based on the MoU between Tangshan and Malmo Municipality, “Tangma”(Tangshan-Malmo) Training Program aimed at promoting communication and exchange of ideas in sustainable urban design area, and the relocation of Swedish Shanghai Expo-Pavillion (Lin 2011)

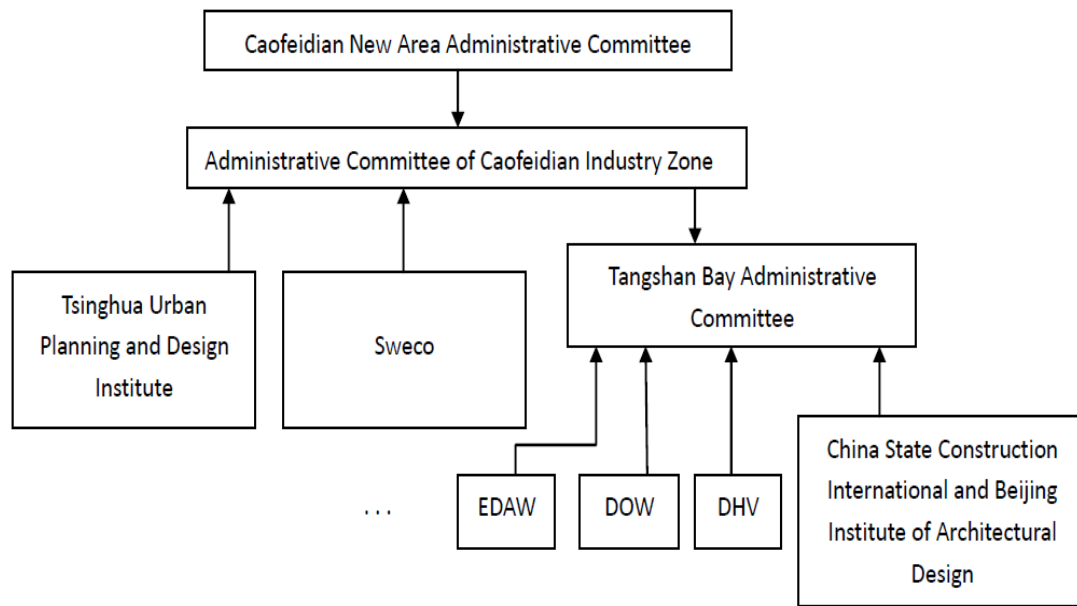


Fig. 5 Organizational structure of Caofeidian International Eco-city (picture by author)

In terms of the collaboration between Caofeidian and Sweco in this case, it is clear that they have a client-designer relationship with political support behind. The joint cooperation with other design institutes can be regarded as the non-exclusive collaboration between the two sides. The distinct and pragmatic partnership also gives both sides clear **power positions** in traditional client-designer relationships. Though national level leaders are not directly involved in Caofeidian Eco-city project, it was their earlier efforts in reaching bilateral framework agreement that laid the foundation for this project. Therefore it can be argued that the indirect **involvement of leaders** still played a positive role in bringing about the collaboration project. The aforementioned agencies like Swedish Embassy, Center for Environmental Technology (CENTEC) are the active **promoters** for the collaboration between Sweco and Caofeidian Administrative Committee. Considering the four dimensions of collaboration between Sweden and China without specially established organization, it can be inferred that the bilateral collaboration is relatively **informal**.

#### 4.1.5. Political support

As one focus-point cooperation between China and Sweden in environmental technology, Caofeidian International Eco-city has received endorsement from both Chinese and Swedish governments at the ministries' level. It is based on the agreements between China's Ministry of Housing and Urban-Rural Development and the Swedish Ministry of Environment on Sustainable Urban Development. At the local level, Sweco's involvement and contribution

builds on the Agreement of Cooperation between Tangshan municipal government and the Swedish Ministry of Enterprise, Energy, and Communications (Ranhagen 2008). Sweco was recommended by the Swedish government to Tangshan Municipality and later got selected to develop the conceptual master plan for the first phase jointly with Tsinghua Urban Planning and Design Institute. The Swedish Embassy, Center for Environmental Technology (CENTEC) have played an active role in supporting Sweco's interactions with the Tangshan municipal government and other involved Chinese consultants. On the Chinese side, Caofeidian International Eco-city has drawn support from different levels of authorities including the Chinese Ministry of Housing and Urban-Rural Development, the Hebei provincial government, Tangshan municipal government and the Caofeidian New District.

#### **4.1.6. Progress and results**

The construction work of Caofeidian International Eco-city started in 2009. By 2010 89 projects had been initiated with a total investment of 30 billion RMB, the same year saw the completion of 21 projects and the start of another 11 projects (China Construction Information 2010). So far a 15 km<sup>2</sup> start-up area in Caofeidian International Eco-city has begun to take shape. The Eco-city Coastal Tourism Area, International School Area, Qinglong Lake Holiday Resort and Sino-Japan Bio-community projects have been initiated. According to the development plan, in 2012 Caofeidian International Eco-city will be actively engaged in the development of coastal tourism industry, low-carbon eco-friendly industry, cultural industry, international education, and medical & health industry (Tangshan Evening 2012).

#### **4.1.7. Identified critical success factors in collaboration**

Based on the case study on Caofeidian International Eco-city above, the critical success factors can be identified as stable political relations, close economic connections, resource interdependencies, capacity potential, match of expectation, involvement of leaders, and the presence of promoters (CENTEC).

### **4.2. Wuxi Sino-Swedish Low-carbon Eco-city (WSSLE)**

#### **4.2.1. Introduction**

Wuxi city has been planning a large expansion in the Taihu New District between the city center and the Tai Lake. An unexpected incident caught the attention of Wuxi city and made

them more concerned with the environmental conditions there. In July 2007, the algae bloom in Tai Lake forced Wuxi city to stop using the water drawn from there for three consecutive days (Swedish Trade Council 2012). Given the opportunity of the expansion project, the idea of an eco-city emerged as a solution to meeting the increasing housing demands while realizing environmental goals at the same time.

In September 2008 Sweden was invited to participate in the planning of the Wuxi city development. Sweden proposed the possibility to develop an eco-city area near the central business district or the western housing area. Initially a 0.3 km<sup>2</sup> area to the west of Taihu New City was chosen to be the cooperation site. Later during the Party Secretary of Wuxi's visit to Sweden in October 2009, the site was enlarged to 2.4 km<sup>2</sup>. The eco-city is situated in the center of the Taihu New City, which has a jurisdictional area of 150 km<sup>2</sup> and a planned population of 850,000. A bidding process for the master plan of Wuxi eco-city was carried out between four Swedish architect firms and Tengbom eventually selected as the winning company in April 2010. On July 3, 2011 the signing ceremony of the "Sino-Swedish low-carbon eco-city memorandum of understanding" between the Wuxi municipal government and the Swedish Ministry of the Environment was held with the presence of Sweden's State Secretary Elisabeth Falemo and officials from Jiangsu Province and Wuxi City (Jiangsu Government 2012). The advanced clean-tech solutions applied in the Wuxi eco-city are intended to be gradually replicated in the rest area of Taihu new city.

The planning of Wuxi eco-city will be another application of the Symbio City concept which represents Sweden's interpretation of the eco-city concept and the Swedish comprehensive and interdisciplinary solution to sustainable urban development (Ulf Ranhagen et al. 2010). Under the guidance of the SymbioCity framework, a three-year action plan was formulated with a preliminary completion time by 2015.

#### **4.2.2. Economic and political background**

The national level political relations and economic connections have already been discussed in Caofeidian International Eco-city case. Here an examination on the economic ties between Sweden and Wuxi will be presented. Wuxi is described by Sweden as a "traditional stronghold of Swedish companies" (Andersson 2011). According to Wuxi's Party Secretary Mr. Yang, 80% of Wuxi's European projects came from Sweden; 40% of European investment in Wuxi is from Sweden (Chen 2009). There are already famous Swedish companies like Volvo, Atlas Copco and SKF in Wuxi as its leading foreign investors. Therefore, in the case of Wuxi

Sino-Swedish Eco-city, close ***economic connections*** can be identified as a crucial factor shaping the collaboration.

#### 4.2.3. Goals and resources of key collaborating parties

Wuxi has its geographical and economic advantages in attracting foreign investments: its distance to Shanghai (roughly 150 km) is even shorter than the distance between Shanghai's old city center and Pudong New Development Area. In terms of economic development, Wuxi is one of Chinese cities with thriving economy. There are eight industrial parks in Wuxi, which attract considerable amount of investment to the city and strengthen the city's exchange with the outside world. Wuxi was even dubbed as "Little Shanghai" in terms of its ideal geographic conditions and advanced development state(Jiangsu.Net 2012).

In the development of Taihu New City which is entitled National Low Carbon Eco-city Demonstration Area, Wuxi municipality expressed great interest in Swedish products in sustainable technology, especially in energy efficiency, waste and water treatment areas. Perhaps more importantly, Wuxi has sufficient financial clouts to support their pursuit for a new sustainable city. With the introduction of advanced environmental technologies from Swedish companies, Wuxi can create a featured project in the national-level low-carbon demonstration area of Taihu New City. It may also attract more Swedish companies to invest in Wuxi with a strong Swedish element in the collaboration. Wuxi thus can also expect an increase in ***capacity potential*** out of the Wuxi Sino-Swedish Eco-city project. Sweden, on the other side, has well-developed promotional strategies for its environmental technology. To assist Swedish companies interested in entering Chinese green industry market, Swedish government offices and the general consulate is prepared to offering support and facilitating their contact with local partners. Again, the supply-and-demand type of ***resource interdependencies*** brings Sweden and Wuxi into the collaboration of eco-city development. Their deeply rooted economic ties also help to build the ***trust*** and align the ***match of expectations*** between both sides; meanwhile the clear technology and service provider role of Swedish companies set the tone of the collaboration with typical client-provider ***power positions***.

#### 4.2.4. Institutional arrangement

A Sino-Swedish working group has been set up since after the establishment of "Sino-Swedish Low-carbon Eco-city Memorandum of Understanding" between Wuxi municipal government and the Swedish Ministry of the Environment to identify relevant parties to join the collaboration between the Swedish and Wuxi governments. Officials from the Wuxi New

City Authority, Swedish Trade Department and Sodertälje City Authority formed the working group(Tengbom 2011). Based on the agreement signed earlier, a Steering Committee and a Technical Committee will be established. The Steering Committee on the Swedish side comprises relevant officials of Consulate General, the International Environmental Technology Cooperation, IMT, and the CEOs of Norrköping and Linköping city administrations. The Swedish members on the Technical Committee include IMT, State Energy Agency and environmental experts involved in city development of Södertälje, Norrköping and Linköping. The Technical Committee so far had two meetings in Wuxi and is currently engaged in the development of Taihu New District's energy plan. They also started the discussion for the design of a residential area and the vacuum transportation system of waste(Swedish Trade Council 2011). Unfortunately there is no public information available about the Chinese members on the planned Steering Committee and Technical Committee. The rough organizational structure is illustrated in Fig. 7 below.

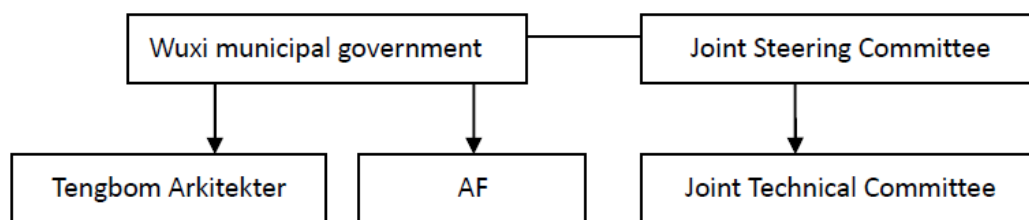


Fig. 6 Organizational structure for Wu Sino-Swedish Low-carbon Eco-city(picture by author)

An initial investment of \$ 5.9 million has been committed to the project which primarily comes from the local government(Chen 2009). The Swedish side will mainly contribute to the establishment of environmental standards for the project and relevant technical advices. Stronger Swedish elements will be embodied in the project with the active involvement of Swedish companies and the proposed Swedish-run international school. Tengbom Arkitekter and AF, two leading Swedish architecture firms have been commissioned by the Wuxi municipal government to jointly master-plan for the eco-city. Tengbom Arkitekter's work in the development of an environmental program for energy use, waste management, water management, traffic, landscaping has won the MIPIM Architectural Review Future Project Award, which is a prestigious Eco-city planning award(Swedish Government Offices 2011). Tengbom also developed eco-indices including the development criteria and environmental indicators together with Swedish Trade Council, authorities from Södertälje and Chinese experts(Andersson 2011). Other Swedish companies in environmental equipment and services are also expected to join the project under the arrangement of the Swedish Trade Council.

From the multi-level organizational arrangement including a steering committee and a technical committee in the project, it can be observed that efforts were made to develop a more formal organizational structure. However, the limited availability of public information on the Wuxi municipal government side still gives a rather blurred impression. There is direct ***involvement of leaders*** from Swedish Ministry of the Environment and Consulate General and Wuxi municipal governments. The Swedish Trade Council also acts as the ***promoter*** to bring in more Swedish companies into this collaboration.

#### **4.2.5. Political support**

Wuxi Sino-Swedish Low-carbon Eco-city was hailed as a “Sino-Swedish Cooperation Demonstration Project” by the Swedish Ministry of the Environment. China’s National Ministry of Housing and Urban-Rural Development granted Taihu New City the title of National Low Carbon Eco-city Demonstration Area, which accordingly elevated the Wuxi eco-city project to a higher level(Wuxi Daily 2010). Being regarded as a key step to further cooperation between China and Sweden in sustainable urban development, Wuxi eco-city is a landmark project signifying the knowledge exchange between Sweden and China in tackling environmental problems and embracing sustainable urbanization.

#### **4.2.6. Progress and results**

The construction work for the Wuxi eco-city has started in early 2012 with an estimated completion time by 2015. In November 2011, with the confirmation on the site selection of the central recycling station, the plan for a vacuum garbage transportation pipelines has been approved. The entire recycling system is expected to be completed by the end of 2012(Hui 2011). A batch of exemplary projects including the eco-tech exhibition center, new energy center, international school and eco-community on the development agenda are also in progress(Taihu Cheng 2010).

#### **4.2.7. Identified critical success factors in collaboration**

Based on the case study on Suzhou Industrial Park above, the critical success factors can be identified as close economic connections, resource interdependencies, capacity potential, involvement of top-level leaders, the presence of promoters, long-developed trust and match of expectations. The partially revealed supervisory arrangement also indicates both sides intend to go one step further by building up a clear organizational structure and drawing in more participating companies. The focused development in Taihu New City may also bring in more synergy for the project and provide a wider arena for Swedish companies engaged in



urban planning and environmental technologies.

### **4.3. Features of Sino-Swedish collaboration**

#### **4.3.1. Client-provider type of collaboration accompanied by political support**

In both Caofeidian International Eco-city and Wuxi Sino-Swedish Low-carbon City the involvement of Swedish companies is introduced by Swedish government agencies (Consul General or Ministry of the Environment). With Swedish Consul General's recommendation, Sweco developed the conceptual master plan for Caofeidian jointly with its Chinese partner Tsinghua Urban Planning and Design Institute. In Wuxi Low-carbon City it was even more the case: the bidding for the master plan was carried out exclusively between Swedish firms. However, there is no particular supervisory board consisting national level officials for the two projects. In Wuxi Sino-Swedish Low-carbon City a Joint Steering Committee and a Joint Technical Committee were reportedly set up, but both committees have a more auxiliary role rather than direct control over contracting companies in the project. Therefore, the Sino-Swedish collaboration in the two projects can be described as a client-provider type of collaboration accompanied by political support.

#### **4.3.2. Package solutions offered by Sweden**

Except for the overall master planning, Sweden also prepared to bring in the technological solutions of Swedish firms. In Caofeidian International Eco-city, except for the urban planning by Sweco, a Swedish firm Purac was also involved in the design and construction of a waste and waste water demonstration plant. Since Caofeidian International Eco-city is a non-exclusive collaboration between China and Sweden, more international firms also participated in different projects of Caofeidian. With the support of Swedish government, Swedish firms still managed to gain a strong presence in Caofeidian. In Wuxi Low-carbon City technology transfer is also an important aspect in Sino-Swedish collaboration and according to CENTEC many Swedish firms have declared their interest to join the new city project.

#### **4.3.3. Built on established cooperation framework**

Both Caofeidian International Eco-city and Wuxi Sino-Swedish Low-carbon City are based on the Memorandum of Understanding between Chinese Ministry of Housing and Urban-Rural Development and the Swedish Ministry of the Environment. Sino-Swedish collaboration in Caofeidian was also supported by the Letter of Intent on Sustainable Urban Development

Cooperation between the Swedish Ministry for Foreign Affairs, Ministry of Enterprise, Energy and Communications and Tangshan City during Swedish Prime Minister Fredrik Reinfeldt's visit to China in April 2008. Therefore, though national leaders are not directly present in the two specific city cooperation projects, they did play an important role in laying down the cooperation framework at a national level to pave the way for further collaboration projects.

#### **4.3.4. Special government agency for the promotion of Swedish firms**

The call for bids on master plan for Caofeidian was announced in December 2007. The same year the Center for Environmental Technology (CENTEC) was established at the Embassy of Sweden in Beijing which aims at promoting and facilitating Swedish know-how in sustainable urban planning and environmental technology export to China. Although CENTEC was not specially set up for Caofeidian International Eco-city, it does play an important role in supporting Swedish companies' participation in later Sino-Swedish eco-city projects and become an important component in Sino-Swedish collaborations in sustainable urban development.

## **5. Sino-German collaboration**

### **5.1. Qingdao Sino-German Eco-park (QSGE)**

#### **5.1.1. Introduction**

The idea of building a Sino-German model city was first proposed by the then German Minister of Economics Mr. Rainer Brüderle during his visit to China in 2009, and it was readily agreed by Chinese Minister of Commerce Mr. Chen Deming. Later the Far East Consulting developed the initial conceptual planning for a Sino-German Ecopark. A series of coordination meetings were held between Germany's Federal Ministry of Economics and Technology (BMWi) and Chinese Ministry of Commerce (MofCOM) about the potential location for the ecopark, and eventually Qingdao was selected as the city for the ecopark. On July 16 2010, during German Chancellor Angela Merkel's visit in China, a Memorandum of Understanding for the joint development of a Sino-German Ecopark was signed between China's Ministry of Commerce and German's Federal Ministry of Economics and Technology. According to the agreement, the two governments have decided to forge a bilateral cooperation for an ecopark with a planned development area of 10 km<sup>2</sup> in the Economic and Technological Development Zone in Qingdao.

Qingdao Sino-German Ecopark is the first eco-intelligent park promoted by Chinese and German governments in the area of energy saving and environmental protection industries. It is positioned to be an exemplary Sino-German cooperation of an international high-tech industrial park with world-class eco-friendly enterprises, R&D institutes and livable residential conditions. The ecopark will adopt a government-guided and market-based operation model. Five theme areas of communication and cooperation have been identified in the eco-park, namely the establishment of energy-saving and environment-protecting technology standards, development and application of new energy and environment technology, sustainable buildings and coastal eco-city, marine technology and industry, and vocational education and training(Investment Promotion Bureau of Qingdao Sino-German Eco-Park 2011). According to the plan, the percentage of green buildings within the ecopark will be 100%, and 15% of the total energy used will be renewable energy. The original residents in the 14 communities will be settled in the residential area of the ecopark, and more that 20% of the housing is guaranteed to be indemnificatory(Qingdao Tourism Association 2012).

The development of Sino-German Eco-park is structured into three stages. By the end of

2012 the overall planning and infrastructure development will be completed and an ecological environment monitoring system will also be set up. The eco-park construction and project introduction will be officially initiated, among which there will be a batch of German leading industrial programmes. During the second stage (2012-2015), the resident enterprises will form into a scale with a starting area of 3.5 km<sup>2</sup>, with the completion of basic urban functions and the establishment of park development pattern and construction layout. The development of the entire eco-park is planned to be completed by 2020, which will then become demonstration zone of Sino-German cooperation in high-end renewable energy and environmental protection industries(Sino-German Ecopark 2011).

### **5.1.2. Economic and political background**

China and Germany have established a strong track record in economic cooperation since China's open-up reform in the late 1970s. Since the two economies are highly complementary, both countries have benefitted from their economic ties and maintained sound growth. As a major export country, Germany has capitalized on China's vast and growing domestic market. China in turn serves as an important supplier for Germany, especially in ICT sector(Erber 2012). Compared to other European countries, Germany managed to have better performance in joining China's integration into the global economy. This was evidenced by its relatively quick recovery from the recent global economic crisis; thanks to its active participation in emerging markets like China, Germany was more resilient to the crisis and maintained its economic growth. China and Germany's emerging symbiosis economic ties can be better illustrated with concrete numbers. In 2011 the bilateral trade amounted to US\$ 169.1 billion, taking up 30% of Sino-EU trade. So far there are over 7,500 German enterprises in China, totaling an accumulative investment of US\$ 18.5 billion. Germany is also China's most important technology provider in EU(Ministry of Foreign Affairs 2012). China, on the other hand, was Germany's sixth-largest trading partner after France, the USA, the Netherlands, Italy and the UK in 2010; however, according to the statistics in 2011, China and is expected to surpass France and become Germany's top trading partner in 2012(MofCOM 2012). A ranking by the German Business Chamber in 2011 also indicated that China has become the most desired investment destination for German companies(Parello-Plesner 2011).

This year 2012 sees the 40th anniversary of China-Germany diplomatic relations. Germany and China have maintained frequent exchanges of high-level visits. After the global financial and economic crisis, quoting the words of Chinese Premier Wen Jiabao, the two countries elevated their relationship to a strategic partnership(Ministry of Foreign Affairs 2012).

In June 2011, the first round of China-Germany governmental consultations chaired by Chinese Premier Wen Jiabao and German Chancellor Angela Merkel was held in Germany. The intergovernmental consultation is the first of its kind cooperation mechanism at governmental level established by China. More than ten cabinet ministers joined the comprehensive dialogue and a series of cooperation declarations were achieved during the meetings. The new comprehensive mechanism will deepen the mutual understanding and **political relations** between China and Germany. It also created new momentum for the bilateral cooperation in the fields of energy and environmental technology. On June 28, 2011 the Chinese Minister of Science and Technology Wan Gang and the German Federal Minister Peter Ramsauer signed a Joint Declaration on Cooperation for sustainable mobility, energy efficiency and innovative transport technology. Pilot projects are planned in Wuhan, Dalian and Shenzhen(Federal Ministry of Transport Building and Urban Development 2011) . The same year a Sino-German team was founded for the feasibility study of a renovation demonstration project of Sino-German low-carbon districts in Wuhan(MAE-Regioni-Cina 2012). During Chinese Vice Premier Li Keqiang's official visit in Germany in January 2011, he also expressed the intention to broaden bilateral cooperation fields and proposed that China and Germany should explore new cooperation areas in new energy, energy efficiency, environmental protection and low-carbon technologies(Lin 2011). Such policy background coincides with the theme of Sino-German Eco-park.

At the local level, Germany and Qingdao have also built up intensive economic connections. In 2010, the bilateral trade between Qingdao and Germany has reached \$ 1.968 billion, taking up a fourth of Qingdao's trade volumes with European countries. Qingdao has also established cooperative and friendly relationship with German cities including Mannheim, Düsseldorf and Regensburg(Dai 2011). These notional level and local level **economic connections** have laid the foundation for the Sino-German Ecopark to further attract business and investment from German companies.

### **5.1.3. Goals and resources of collaborating parties**

The Sino-German collaboration on Qingdao Ecopark should be understood in the complex and fluid international environment and the ongoing European debt crisis. The green industry is predicted to be a new growth engine for investment cooperation between China and the EU. Many European companies have invested heavily in renewable and new energy sectors, and need to expand overseas given the current economic crisis. Germany as one of the largest technology export countries faces the same challenge. China's vast market and rich labor resources thus become an important expansion destination for companies engaged in clean

technology. Unlike traditional areas such as auto making, chemicals and machinery, green industry in China is far from saturated and still has enormous profit potential to tap on. For companies engaged in sustainability field, while being attracted by China's broad domestic market, they would rather take on a wait-and-see attitude due to their relatively unfamiliarity with the Chinese environment and the to-be-developed state of sustainable technology market in China. However, Germany as the largest investor in China among EU nations has a larger share of interest to take part in the sustainable urban development in China. Against this background, the German government took the initiative to create a stable platform for these companies to venture into China and offer necessary assistance along the way.

China, on the other hand, is already experiencing the transformation towards sustainable development and thus is in urgent need of green technologies. Germany owns advanced and sophisticated technologies and has always been China's largest source of technology in EU nations. Their modern management expertise is also highly desirable in China's high-tech and service industries. Moreover, recently China has put more emphasis on the promotion of small- and medium-sized (SMEs) companies. Germany's rich experience in SMEs development can provide valuable lessons for China to draw upon. Hence, when China's vast market and abundant labor resource is combined with the technological strength of Germany, more opportunities will be created to promote China's economic restructure and industrial upgrading. Germany will also benefit from China's advantage in market volume and production capacity, and become more competitive in the global market.

From the analysis above, it becomes obvious that it's the tight ***resource interdependencies*** that prompt China and Germany to further strengthen their business ties through government promoted collaboration projects like Qingdao Sino-German Ecopark. In the increasingly complex international economic environment, their visions and goals converged into the exploration for new economic growth source. Green industry is just one collaboration area where they will redouble efforts in. In this sense, there is a ***match of expectations*** between China and Germany in the promotion of environmental cooperation.

At the local level, Qingdao also has favorable conditions appealing to the German investors. Situated on the west bank of Jiaozhou Bay, Qingdao city is an east coastal metropolis in China. It serves as the centre of Chinese shipping industry and the headquarters of some famous Chinese companies. As one of the top five state-level development zones, Qingdao Economic and Technological Development Zone (QDA) was established early in 1985 and has developed into a new dynamic economic zone with favorable investment climate after more than two decades' effort. Now with the establishment of Qingdao Sino-German Ecopark, QDA

is expecting a new surge of rapid development in high-tech and green industries. The **capacity potential** factor can also be expected to play a role in this case. The backup from national governments represented by BMWI and MofCOM enables QDA to join the strategic environmental cooperation agenda. It will spearhead in the development of green industries and become an iconic city connecting German and even European companies and China.

#### 5.1.4. Institutional arrangement

The Sino-German Ecopark is defined on the German side as a “privately financed project, which is politically accompanied and supported by the Federal Ministry of Economics and Technology(BMWI) and Ministry of Commerce (MofCOM)”(Sino-German Ecopark 2011). Based on the MoU signed between the Ministry of Commerce and the Federal Ministry of Economics and Technology, the Sino-German collaboration will revolved around “cooperative development” and “joint projects”(Qingdao Development Zone PRTC 2012). An area in the Qingdao Economic and Technological Development Zone (QDA) will be assigned to the cooperative development, and the two sides will establish a joint venture as the vehicle for their collaboration. The JV will be responsible for the land development, investment advisory, project introduction and overall management of the park. Joint projects will be organized in the core cooperative area which involves introducing energy efficient and environmentally-friendly enterprises to the eco-park and further attracting business and investment for the long-term goals(MPB DY 2012).

Currently, the Qingdao Economic and Technological Development Zone (QDA) has set up a Sino-German Eco-park headquarter to monitor the development of the eco-park, an administrative committee is also planned to be established. A state-owned enterprise Qingdao Sino-German Eco Park Development Co.,Ltd was founded in November 2011 with a registered capital of 500 million RMB from Qingdao Economic and Technological Development Zone (QDA). It will be responsible for the infrastructure development, marketing, investment service, and operations management of the eco-park (Qingdao Development Zone PRTC 2011). The German side is also organizing an investment consortium mainly comprises the German Industry and Commerce Co., Ltd and Far Eastern Consulting company. (MPB DY 2012). To date details of to be established JV are still under negotiations. The German architectural office of Gerkan, Marg and Partner (GMP) was appointed to master-plan the Sino-German Ecopark in the Qingdao Economic and Technological Development Zone. The German company Far Eastern Consulting is chosen to be an official representative and contact partner for the Qingdao Sino-German Ecopark in Germany. A Chinese company China General Consulting & Investment Co.,Ltd was also entrusted to formulate development plan and identify suitable

industries for the eco-park. TÜV NORD and a Chinese company Bluepath City Consulting was commissioned to jointly develop an eco-park index system covering 40 indicators in 5 aspects(Sino-German Ecopark 2012). Based on the plan, the organizational structure is illustrated in Fig. 5 below.

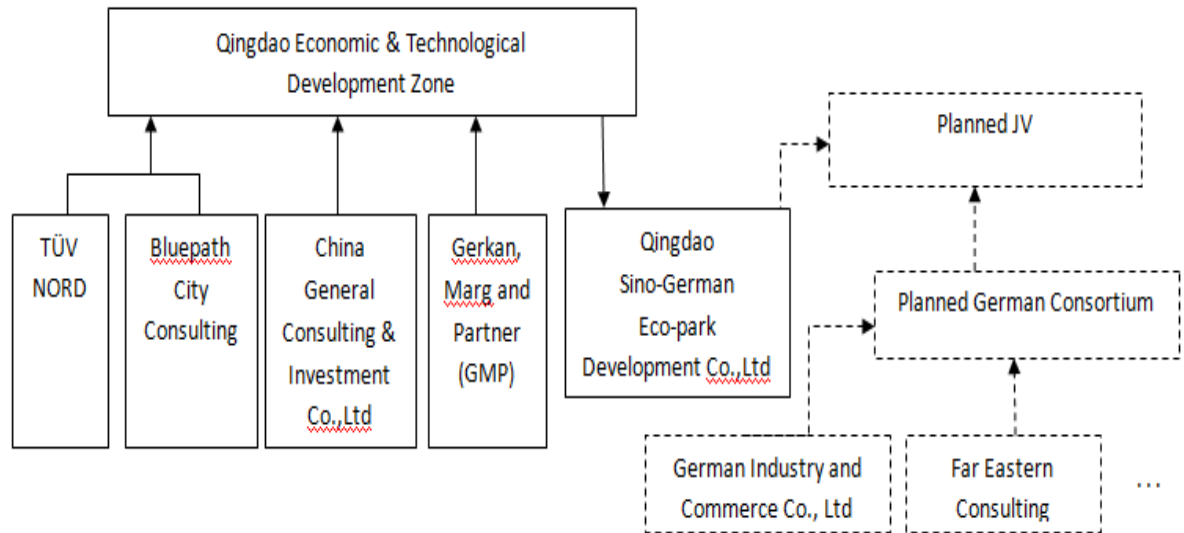


Fig. 7 Organizational structure of Qingdao Sino-German Eco-park (Picture by author)

In order to drive the progress of park development, meetings of ministerial level will be held every half year. Vice ministers from the Ministry of Commerce and the Federal Ministry of Economics and Technology will attend the meeting(MPB DY 2012). Regular working group meetings and visits of enterprise delegations are arranged by the government to encourage the participation of German companies.

Although the organizational structure has not been completely established, it can be inferred from the preliminary arrangements (regular working group meetings attended by vice-premiers) that both sides stressed the **formality** of communication and coordination in the project. Qingdao Sino-German Ecopark has received top-level leaders support from both sides. Chinas' Ministry of Commerce and German Federal Ministry of Economics and Technology (BMWI) initiate and promote the project, indicating a close **involvement of leaders** at ministerial level. While the German consortium is still to be founded and detailed project concepts are under discussion, the two ministries assumed more responsibilities as the **promoters** for the project and try to encourage more active participation from private sectors. The Sino-German Ecopark Forum held at Hannover Messe in April 2012 is just an example of its promotion activities among German companies.



### **5.1.5. Political support**

Qingdao Sino-German Ecopark is initiated as an inter-government collaboration between China and Germany. Hence, great importance has been attached to the ecopark development by the multiple levels of authorities including China's State Council and Shandong provincial, Qingdao municipal governments. This is evidenced by the huge investment committed to the infrastructure development, the prompt establishment of administration system for the ecopark, and the energy-saving and environment-protecting technology standards created and adopted in the project. The German government is committed to encourage the participation of more government agencies, enterprises, associations and trade unions into the development of the ecopark. They will also offer support for a German technology and product exhibition center in the park to showcase German industries' achievements in environmental technology. On-site visits of German enterprise delegations will also be organized by the German government in several rounds to promote business investments for the ecopark(Qingdao Foreign Investment Division 2012).

### **5.1.6. Progress and results**

On January 1, 2012, the foundation stone laying ceremony was held with the attendance of high-ranking officials from BMWI, MofCOM and related industry representatives. As the first Sino-German ecological intelligent industrial park, Qingdao ecopark was presented at the world's most renowned industry fair Hannover Messe 2012 in this April. For now the Qingdao Sino-German Ecopark is in the planning and pre-construction phase and has started investment attraction for 24 programmes. So far Siemens, Beijing Energy-Net De., Ltd and German Center have decided to settle in the ecopark in the near future. The local villages are being reconstructed with the basic infrastructure, as well as roads and pipelines connection. It is estimated that construction of the eco-park will be officially kick-started in August this year. The preliminary development of roads and energy system will be finished by the end of 2012. In addition, preparation for a German center in the ecopark is also started to promote the moving-in and development of Chinese and German small- and medium-sized enterprises(Sino-German Ecopark 2012). In June 2011 Chinese Premier Wen Jiabao announced their decision to set up a 2-billion Euro special loan to support cooperation between Chinese and German small- and medium-sized enterprises (SMEs) during his speech at the sixth Chinese-German Forum for Economic and Technological Cooperation in Berlin(Xinhua 2011). It is reasonable to expect that such policy will bring more Chinese and German SMEs into Qingdao Sino-German Ecopark soon. By June 2012, Sino-German Eco-park has been in negotiations with more than 20 companies and signed 12 agreements(Lin and Xie 2012).

### **5.1.7. Identified critical success factors in collaboration**

Based on the case study on Qingdao Sino-German Eco-park, the critical success factors can be identified as thriving economic connections, strong resource interdependencies, match of expectations, involvement of leaders, and presence of promoters. The to-be established organization arrangement including German consortium and JV also indicates an intended clear and formal organizational structure for the eco-park.

## **5.2. Features of Sino-German collaboration**

### **5.2.1. Privately-financed, accompanied by political support**

Though Sino-German Eco-park was initiated by the governments, it is positioned as a privately-financed project accompanied by political support from Chinese Ministry of Commerce (MofCOM) and German Federal Ministry of Economics and Technology (BMWI). BMW has promised to bring the project to German companies' attention by organizing business delegations to Qingdao on a regular basis. The cooperative development and joint projects will be negotiated between German firms, Qingdao Economic and Technological Development Zone and Chinese enterprises. The two ministries serve as the promoter and facilitator in this project, while details of the arrangement are to be negotiated between the eco-park authority, German and Chinese enterprise groups.

### **5.2.2. Experienced company as the spearhead**

In Qingdao Sino-German Eco-park the Far Eastern Consulting company has played a significant role as the official representative and contact partner for the Qingdao Sino-German Ecopark in Germany. The company has based on China for more than 20 years and is rich in knowledge of Chinese market. Its main target customers are German companies interested in venturing into China. With many native Chinese consultants on the team, Far Eastern Consulting has cultural familiarity with China and established personal contact with economy and policy decision-makers in China. Its deep root in China has played a crucial role in coordination between Chinese parties in the early phase. In fact, it is also Far Eastern Consulting developed the first concept of Sino-German Eco-park which provided the basis for later coordination meetings between MofCOM and BMWI. In April 2012 again it is the same company introduced the Sino-German Eco-park to German representatives of economics and politics at Hannover Messe in cooperation with BMWI and QDA. Consulting companies are usually acknowledged for their expertise in project management, and thus having a good fitness of the role as the project coordinator. However, in most Chinese eco-city projects, the coordination responsibility

falls to bilateral cooperating governments. In Qingdao Sino-German Eco-park, MofCOM and BMWI are not directly involved. Thus such an experienced consulting company with extensive contextual knowledge and top-notch contact with policy makers filled in the gap and made it possible for the two ministries to relatively lay back and play a supportive role.

## 6. Sino-Finnish collaboration

### 6.1. Sino-Finnish Mentougou Eco-valley (SFME)

#### 6.1.1. Introduction

Mentougou District lies to the west of the city center of Beijing. Among its 1455 km<sup>2</sup> total area, 98.5% of the land is mountainous region, making it the only district of pure mountain area in Beijing City. Since 2007, Mentougou has been planned to bear the brunt of ecology restoration of Beijing based on the strategy of “the Ecological Conservation and Developing Area of Beijing” and “West Synthesizing Service Area” by the Beijing municipal government(EcoTech 2011). This leads to the idea of building an eco-city in Mentougou as an important carrier for the realization of ecological conservation in Beijing. Inspired by the Finnish concepts of “High-tech Eco-city” and “Digi Eco-city”, the Mentougou governments invited the VTT Technical Research Centre of Finland to conduct a feasibility study on building an eco-city in the Mentougou District in 2008. This was followed by a strategic conceptual planning of the eco-city by Beijing Ecological Technology Institute for Mountainous Areas during 2009 and 2010. An initial plan has allocated 160.3 km<sup>2</sup> for the Mentougou eco-city which ranges across Miaofeng Town, Wangping Town, Junzhuang Town and Yongding Town. As part of the eco-city area, an eco-valley with a total planning area of 38.4 km<sup>2</sup> was to be jointly developed by China and Finland. From 2010 to 2011, the Finnish companies Eero Paloheimo Eco-City Ltd. and Eriksson Architect Ltd. are commissioned to undertake the master-planning of the Sino-Finnish Mentougou Eco-valley(Eriksson Architects 2011). On May 26 2010, the strategy cooperative agreements on ecological construction in Mentougou eco-valley was signed between Mentougou District government and related Finnish enterprises with the presence of Chinese Vice-Premier Li Keqiang and Finland’s then President Tarja Halonen(Mentougou Government 2011).

Sino-Finnish Mentougou Eco-valley is envisioned as a new type of “digit, low-carbon and ecological” city. It is estimated to begin to take shape in about five years with an initial investment of one billion Euros. With a total planning area of 38.4 km<sup>2</sup> and a radiation-development area of over 100 km<sup>2</sup>, it will become not only the first digital low-carbon eco-city in China, but also the largest eco-city in the world upon completion. Its

planning has integrated nine themes including sustainable energy, water management, waste treatment, resource management, residential environment, transportation and logistics, communication, management and industrial development(CSUS 2011).

Mentougou Eco-valley is spatially arranged into three areas: the central start area (7.71 km<sup>2</sup>), functional expansion area (38.4 km<sup>2</sup>) and radiation-development area (100 km<sup>2</sup>). The central start area will accommodate 19,000 and is expected to roughly form a scale in five years. The functional expansion area is the eco-valley's main construction site. It covers six administrative villages and will contain several major areas including water, tourism and research areas. All these areas are to be connected with eco-corridors constructed in compliance with eco-friendly and low-carbon criteria. According to the plan, there will be nine R&D institutes in the eco-valley focusing on different themes including transportation, eco-food, energy, IT, medical science, tourism and entertainment. These institutes are designed to attract international high-tech companies to the eco-valley and exhibit their state-of-the-art ecological technology solutions. The design of a unique interior operating system bonding ecology, living and scientific research together will provide a self-sufficient eco-system with highly-efficient metabolism of nutritive material(Yu 2011). Sino-Finnish Mentougou Eco-valley will be characterized by features including self-sufficient water and energy supply, ecological transportation (bicycle, tram, electrical car and pedestrians), and energy-efficient building solutions(EcoTech 2011).

### 6.1.2. Economic and political background

In terms of ***economic connections***, China is Finland's largest trading partner among Asian countries and biggest import market outside Europe. According to the EK statistics, over 260 Finnish enterprises have invested in Chinese market, especially in IT, forestry and machinery industries. Among them there are famous world-class companies like Nokia, UPM, Metso and Kone, etc. Finland in turn among North European nations is an important source of FDI and technology for China(MofCOM 2008).

Both countries also maintained sound ***political relations*** since the 1950s. There are brisk exchanges of visits between both countries, During Chinese Vice President Xi Jinping's visit in Finland in 2010 for their 60th anniversary of diplomatic relation both countries also expressed mutual wishes to deepen their cooperation.

### 6.1.3. Goals and resources of collaborating parties

A key advocate for the Sino-Finnish Mentougou Eco-valley is the Finnish Professor Eero Paloheimo. In his book *The Way Towards a New Europe* he originally proposed the idea of building an eco-city in China. His theoretical analysis and detailed solutions for tackling environmental problems earned him worldwide recognition and in China Professor Eero Paloheimo was came to known as an influential scholar in eco-city studies. With his idea of establishing a Finnish technology based Chinese eco-city, in 2007 a Finnish technical research organisation VTT introduced the Finnish High-Tech EcoCity concept to China(VTT 2008). VTT was subsequently commissioned by Mentougou District government to make a feasibility study on planning and building an eco-city there. Finland's traditional expertise in IT, forestry and education is always appealing to China. Now with Finnish environmental know-how, Finnish side tries to combine their eco-city solution with Finnish high-tech expertise, which is particularly attractive for Chinese's cities eager for a sustainable development strategy.

The Miaofeng Mountain range where Mentougou Eco-valley is located in used to be the quarry area. The coal mines in the surroundings also caused considerable resource depletion and environmental detriment. VTT's vision of building an eco-valley with the excavated mountains can fully satisfy the requirement of ecological restoration and set up a low-carbon mountain building that is closer to nature using the abundant local light and heat conditions. With the support of Beijing municipality, Mentougou District hopes to introduce the Finnish concept of High-Tech EcoCity and realize its goals both in terms of ecological restoration and development of knowledge-based industries. Finnish green industry companies in turn showed enthusiasm in exploring the Chinese market. Such **resource interdependencies** give birth to this collaboration project.

### 6.1.4. Institutional arrangement

Sino-Finnish Mentougou Eco-valley project is owned by the Beijing Mentougou District government. The investors for the project are the Chinese government and enterprise groups. Other cooperation parties include Oy Eero Paloheimo Ecocity Ltd and Eriksson Architects who jointly developed the detailed master plan for the eco-valley, and the Beijing Municipal government who is involved in the coordination(Ari Makkonen 2010). Many design companies and constructors also participated in the initiative, among which there are Beijing Geo-Engineering, Hongkong Shima Group and Design Institute, Global Eco Solutions Oy, etc (a spin-off company of VTT to implement eco-city projects).

Mentougou District government has signed an overall planning contract and an

international marketing contract with a Finnish company Eero Paloheimo Ecocity. Established in the beginning of 2009, Eero Paloheimo Ecocity is an expert in ecological infrastructure design mainly based on Professor Eero Paloheimo's extensive research on eco-city(EPECC 2012). The organizational arrangement on the Chinese side also took an unconventional approach. Mentougou District government adopted a "duty-allocation" development and business attraction mechanism: the Miaoling Mountain Administrative Committee (founded by the Mentougou District government) will be responsible for offering employment or administrative services for the residential enterprises. The operation of the eco-valley will be handed over to a project management company (name unavailable) consisting of members from Mentougou District government and a Chinese investment company named Huashangsanjin Investment Co Ltd. This co-founded company will be responsible for the construction, management and business attraction of the eco-valley in a market-based operation mode(Yu 2011). The organizational structure of Mentougou Eco-valley is shown in Fig. 8. More Finnish companies will be encouraged to join the collaboration with the assistance of the Finnish Environmental Cluster for China (FECC), a fully Finnish national venture launched by the Finnish Ministry of Environment and Economy back in 2006 mainly aimed at promoting cleantech cooperation between China and Finland with main financers of Tekes, Sitra, Teknologiateollisuus as well as regional corporate development organizations such as Lakes, Jykes and Oulu Innovation(Energy Enviro Finland 2007).

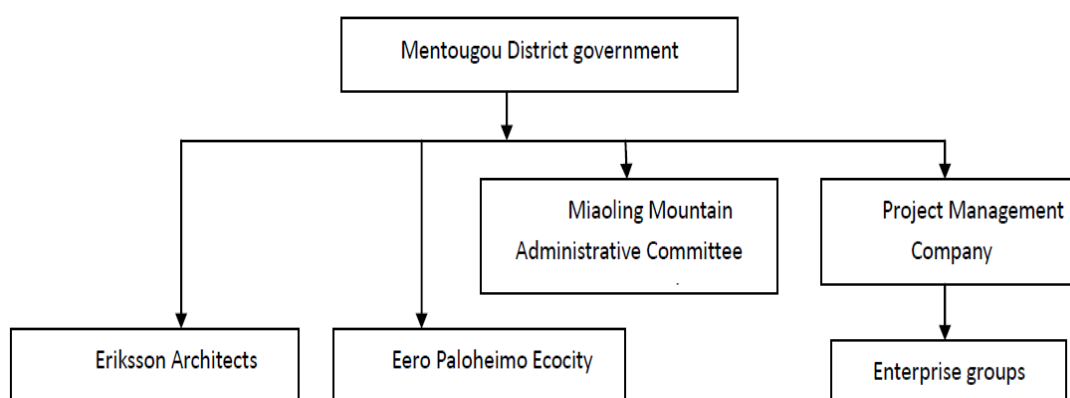


Fig. 8 Organization structure of Sino-Finnish Mentougou Eco-valley (picture by author)

Initially a Finnish-Chinese joint venture was planned to be established for the construction of the eco-valley, and VTT has already established a spin-off company, Global EcoSolutions Oy for the implementation of the eco-projects together with its local partners(Kinnunen 2008). A Sino-Finnish investment company was also planned to be jointly established to be responsible

for the operation of the eco-valley and business attraction. However, so far these planned joint ventures didn't come true and Mentougou District government has already partnered with a Chinese local investment company for project management and business attraction of the eco-valley. This may throw some light on the unbalanced **power positions** and a lack of business and financial resources on the Finnish side. The limited information available about the organizational arrangement for the Sino-Finnish collaboration in the project may also indicate a degree of **informality** in terms of collaboration mechanism. This can be readily understood given the project origin and the later symbolic **involvement of leaders** at national levels. FECC as an important vehicle to facilitate cleantech cooperation between China and Finland can be identified as the **promoter** on the Finnish side.

#### **6.1.5. Political support**

Sino-Finnish Mentougou Eco-valley is located in China's political nerve of Beijing and has therefore received support from the Beijing municipal government. The support of Finnish government in this collaboration comes indirectly from FECC and the symbolic presence of top leaders at important occasions like the agreement signing ceremony.

#### **6.1.6. Progress and results**

As soon as the eco-valley project started in June 2010, all the township coal mines in Mentougou area had been shut down. So were the sandstones, cement and brick businesses. The Mentougou District government has signed agreements on cooperative projects with 20 international companies and drawn in an investment of 150 billion RMB in June 2006(Ma 2010). In 2011 Sino-Finnish Mentougou Eco-valley has entered the market operation stage. Large-scale business invitation has been launched in the same year, as well as some construction projects. It is estimated that the eco-valley will take shape by the end of China's 12th five-year plan (2011-2015). Currently there are already 4 programmes signed and began to move in the eco-valley, including the energy college and a Confucius college(Yu 2011).

#### **6.1.7. Identified critical success factors in collaboration**

Based on the case study on Sino-Finnish Mentougou Eco-valley, the critical success factors can be identified as resource interdependencies, capacity potential, political support, involvement of leaders, and presence of promoters.



## **6.2. Features of Sino-Finnish collaboration**

### **6.2.1. Academia as spearhead**

Unlike many other Sino-foreign eco-city projects, Sino-Finnish Mentougou Eco-valley originates from the inspiration of the Finnish High-tech Eco-city concept developed by VTT Technical Research Centre of Finland. Facing the challenge of ecological restoration, Mentougou District government needs a visionary master plan for its spacious yet to a degree environmentally damaged area. The feasibility conducted by VTT convinced Mentougou District government that the Finnish expertise in sustainable urban planning can help them to revitalize Mentougou into a high-tech based eco-valley. Moreover, the Finnish Professor Eero Paloheimo also played an important role by bridging the connections of Finnish academia and urban design companies. He originally proposed the idea of building a Finnish technology based eco-city in China. One of the main participating company Eero Paloheimo Ecocity Ltd. is based on his extensive research in ecological infrastructure design and carries his prestige as an eminent and influential researcher. Thus the Mentougou Eco-valley is characterized by the active involvement of Finnish academia.

### **6.2.2. Ambiguity in organizational arrangement**

The search for empirical information on Sino-Finnish collaboration on Mentougou Eco-valley is especially difficult, since there is no official website for Sino-Finnish Mentougou Eco-valley or special coverage on both sides. Limited information mainly comes from participating companies' website and fragmented newspaper reports. The limited public information on the collaboration project leaves a rather blurred impression about its organizational arrangement. However, the limited information from scrappy sources still revealed some interesting findings. The earlier project introduction on VTT website and magazine interview with Eero Paloheimo in 2008 indicates that a Joint Venture is to be established for the development of Mentougou Eco-valley. However, to date no such JV has been founded. The official website of Mentougou District government also briefly introduces that Sino-Finnish Mentougou Eco-valley project has received both countries' national leaders' support and no further details are available. The fact that there is a lack of clear and definite institutional arrangement for the collaboration may as well insinuate that both parties have somewhat reserved attitude at the beginning of the project. This may as well have to do with the special situation in the project. Unlike other new development or expansion development eco-cities in China, Mentougou is a "retro-fit" eco-city project. The mountainous area, damaged natural environment, and the 38.4<sup>2</sup> planning site make it a unique eco-city initiative in China. All these special conditions made it difficult for Finnish companies to commit

themselves in the large-scale project and make investments. One can argue that the collaboration still worked out: Eriksson Architects and Eero Paloheimo Ecocity contributed their master plan; FECC was also involved as a promoter and supporter on the Finnish side. Mentougou Eco-valley as a one of its kind eco-city initiative received the attention of the world with the label of Sino-Finnish collaboration. The Finnish interpretation of eco-city concept was conveyed by the project. Finnish institutes and companies like VTT and Eriksson Architects made their name known in China with a signature project and were able to get into contact with a network of Chinese local counterparts.

### **6.2.3. Symbolic support from national leaders**

In Sino-Finnish Mentougou Eco-valley there is no supervisory board consisting of high-rank leaders from the two countries. Though in VTT's website it was mentioned that there was an advisory board in which Professor Eero Paloheimo and VTT's Vice President Professor Kari Larjava are the Finnish members, no clear elucidation has been made about the composition or degree of formality of the advisory board. Indeed there is presence of national leaders on important occasions. Finland's then President Tarja Halonen and Chinese Vice-Premier Li Keqiang attended the cooperative agreement signing ceremony for Sino-Finnish Mentougou Eco-valley. Thus it can be observed that the support from national leaders are rather symbolic than substantive.

## 7. Sino-British collaboration

### 7.1. Dongtan Eco-city

#### 7.1.1. Introduction

Dongtan is located at the near east end of Chongming Island, the world's largest alluvial island at the mouth of the Yangtze River. Facing the enormous pressure of the large influx of workers, the Shanghai Municipality decided to develop the peripheral areas and Chongming Island was thus targeted as a future burgeoning district. The Shanghai Industrial Investment Corporation, a state-run investment arm and the then second largest real estate holder in China, was appointed to develop a plan for Dongtan City in 2004. Dongtan is a tract of 86 km<sup>2</sup> land to the southeast of Chongming Island. With its unique ecological conditions, was thus planned to become a sustainable city model for the world. SIIC described its general vision for Dongtan: "to skip traditional industrialization in favor of ecological modernism." (Hefa 2010)

In 2005 Arup was commissioned by the Shanghai Industrial Investment Corporation to master-plan for Dongtan City. Arup came up with an integrated urbanism approach addressing environmental, social and economic sustainability after studying the particular conditions in Dongtan. In order to protect the migrating birds' habitat near Dongtan, a unique "buffer zone" is also created to conserve the wetland for wildlife (Hefa 2010). The initial plan for the development of Dongtan was divided into several phases. First a demonstrator phase is scheduled to accommodate up to 10,000 residents within 1 square kilometer area by 2010. This will also be included as one of the main features representing the theme "Better City, Better Life" in Shanghai's 2010 World Expo. Then the second phase will ensue, featured by a fully developed area of 6.5 square kilometres accommodating up to 80,000 people by 2020. Eventually the project's ambition is to shape up Dongtan into a 30 square kilometers city with 500,000 inhabitants by 2050 (Hefa 2010).

One of the key aspects in the master plan is a Harvard-like model Arup has conceived for Dongtan (Castle 2008) as part of its commercial strategy. Socioeconomic study had been carried out to identify the appropriate job type to be created, and a Dongtan Institute for Sustainability constitutes the core ambition for the strategy. It is intended to be a prominent international center for environmental study, thus creating job opportunities in teaching, research and related services for the university. Over time the institute is envisaged to have spin-off businesses around the campus like Harvard and MIT.

### 7.1.2. Economic and political background

Back in 2004 UK is the top investor in China and Hong Kong among EU nations. According to the then British Trade Minister Ian Pearson, there were more than 4000 projects invested by UK in 2004(Lunn et al. 2006). The same year saw over £2.3 billion of goods and £1 billion of services were exported to China by UK, marking a record high back at that time. UK's strong performance in financial and professional services sector, as well as science and engineering base and strong retailing sector had benefited from the growth of Chinese market. In addition, the British government had foreseen the opportunities in environmental technologies during China's rapid industrialization and was prepared to help UK business to transfer their technologies to China. Against such background, the cooperation between the British design and engineering firm Arup and Shanghai Industrial Investment Corporation become a highlight cooperation project in sustainable urban design services.

Tighter economic connections in turn spurs deepened political co-operation. During the then British Prime Minister Tony Blair's visit to China in 2003, he agreed with the Chinese Premier Wen Jiabao that a group should be strengthen the bilateral relations between China and UK. In 2003 f the UK-China Task Force co-chaired by British Deputy Prime Minister, John Prescott and China's State Counsellor Tang Jiaxuan was set up as a high-level contact mechanism to deepen cooperation in areas of mutual interest(Lunn et al. 2006). Thus though the **political relation** and **economic connections** are not the direct driver for cooperation in Dongtan eco-city, the prevailing factors have cultivated a favorable climate for the collaborating parties to set higher ambitions for the project and to receive attention from top level leaders.

### 7.1.3. Goals and resources of collaborating parties

The major impetus behind the Dongtan eco-city project was the growing population in China and the continuous influx of workforce into Shanghai. Before the involvement of Arup, Dongtan was intended to be a dormitory town. The initial plan developed for Dongtan was a single-use housing development accommodating between 25,000 and 28,000 people(Castle 2008). However, Dongtan is located near a national wetland reserve which is also one of the most important migratory bird sanctuaries. The Chinese national government were thus concerned about the potential threat to the wetland and ecology of Chongming Island brought by the housing development. Against this backdrop, priorities have been given to the protection of the regional ecological environment. Shanghai Industrial Investment Corporation (SIIC) first hired McKinsey &Company for the selection of different design and engineering

firms to address the wetland protection issues in the project. McKinsey contacted Arup, a U.K. based engineering and consulting firm best known for its expertise in built environment, to figure out if it is possible for SIIC to expand into Dongtan without ruining the wetland or disturbing the bird habitat there. Arup has recognized Dongtan should not effectively function as a small-scale commuter town and instead come up with an integrated urbanism plan for the development of an eco-city in Dongtan.

An examination into the project origin can shed some light on the expectations of Shanghai Industrial Investment Corporation and Arup. It can be argued that there may be some ***mismatch of expectations*** from both sides in the beginning, and this is evidenced by the reaction of the developers when the estimated cost came out. Since high ambitions have been set for this project, multiple features including sustainable building and renewable energy are encompassed in the design by Arup. As Arup understands, Dongtan eco-city would be a flagship project in China and it's a perfect opportunity to present their knowledge and expertise in the field of built environment. A primary driver for an internationally renowned company as Arup to join the initiative is to reach out for higher standards and get more quality out of the project. It can be naturally understood given the fact that Arup was selected based on their excellence in the design work. However, there is a strong commercially-driven nature in the project, evidenced by the fact that Arup was hired by the investment company instead of Shanghai or Chongming government. The fundamental reason for Shanghai Industrial Investment Corporation to bring in Arup is to seek for a solution to the wetland preservation in the development of Dongtan and to assure the central government that the local ecology problem would be properly addressed. It was not Shanghai Industrial Investment Corporation's original intention to build a masterpiece of world-class eco-city; as a matter of fact they were targeting at the high-end housing market and planned to build villas in the area. Arup on the other hand may not fully discern the implicit wish and condition of SIIC and developers. As much as they want Dongtan to be an exemplary eco-city, they are also practical and hence expect the project to be affordable with profit potential. This can also be evidenced by the fact that Shanghai Industrial Investment Corporation didn't recruit technology companies but real estate developers design and engineering firms. Arup's ambitions of exhibiting its expertise in this project and establishing a foothold in the Chinese market prompt them to apply the concept of eco-city in this project and elevated it to a higher level.

#### **7.1.4. Institutional arrangement**

Being solely responsible for appointing companies to the project, SIIC first hired McKinsey & Company for the selection of design and engineering firms to be involved in the project. Later

Arup, which is a U.K based engineering and consulting firm best known for its expertise in built environment, was recommended by McKinsey and SIIC offered Arup the lead design role for the master plan of Dongtan(Castle 2008). Arup is responsible for urban design, sustainable energy management, waste management, renewable energy process implementation, architecture, infrastructure, as well as the planning of communities and social structures(Hart 2007). The organizational structure for Dongtan project is shown in Fig. 9 below.

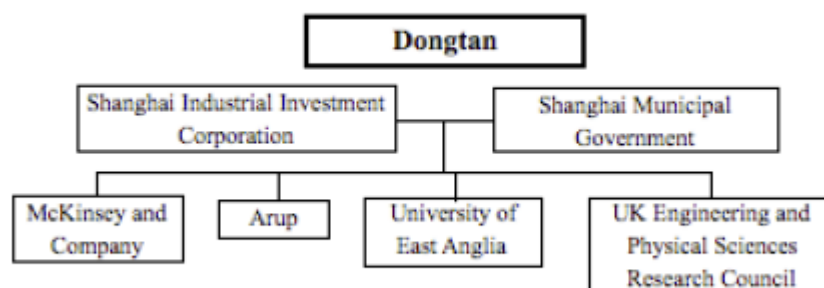


Fig. 9 Organizational structure of Dongtan(Alusi et al. 2011)

Noticeably, the project was initiated before Arup's engagement. With Mckinsey's recommendation, SIIC selected Arup to make a master plan for Dongtan. Arup's later involvement may underline its role as a service provider rather than co-operator in this scheme. Its influence may be limited to the original role SIIC has assigned for it, making it difficult for Arup to help to materialize the scheme. However, this seemingly apparent client-designer relationship later became one of the underlying reasons for the serious delay of the project. As soon as the plan was presented to the SIIC, Arup found itself having little sway in implementation but to wait for the final start date decided by the Chinese side. Thus there were highly **unbalanced power positions** between Shanghai municipal government and Arup.

Another MoU was signed between Arup, SIIC and the University of East Anglia carbon reduction team in the U.K focusing on the Dongtan Sustainable Technologies and Renewables (STAR) Project(Annissa Alusi 2011). Eventually a long-term strategic partnership has been established between SIIC, Arup, HSBC and the UK investment bank Sustainable Development Capital LLP (SDCL) for the financing of Dongtan project.

### 7.1.5. Political support

At the local level, Shanghai municipality initiated the project and even an 'eco-city southwest' plan covering 120 square kilometers was developed by the Urban Planning Institute of Shanghai before the engagement of Arup. The Chinese national government at first were concerned about the potential threat to the wetland and ecology of Chongming Island. With the eco-city solution proposed by Arup, more support was garnered from the national government. During the state visit of President Hu Jintao to UK, the signing ceremony was held between Arup and SIIC at 10 Downing Street with the presence of the Chinese President Hu Jintao and Britain's then Prime Minister Tony Blair on November 9th, 2005(Annissa Alusi 2011). This event has elevated the project to a higher international level and gained closer interest of the British government thereafter. In July 2008 the Britain's then Prime Minister Gordon Brown visited Shanghai. The master plan for Dongtan eco-city was presented to the Prime Minister and was hailed by Mr. Brown as a successful example of cooperation between Britain and China. An agreement was reached by Mr. Brown and Chinese premier Wen Jiabao to boost trade by 50% by 2010, and the British PM provided £ 50 billion to help China with the climate change issue on the same trip(Castle 2008).

Some scholars have pointed out that there is a lack of government financial incentives in Dongtan project, which in turn may insinuate that the national government sees it more as a green image-building project showing their efforts in tackling environmental problems in urbanization, rather than truly anticipating the materialized radical changes it's going to bring. ***Symbolic involvement of leaders*** helps to bring more prestige to the project, but this nominal support was overshadowed by a lack of stable cooperation platform at a higher level and government policy incentives. The situation become more troubled when no clear complementary road map for implementation was made after the design became available(Hooning et al. 2010). The design work was detached from the undertaking and handed over to Arup, and somehow there was not enough coordination between the interfaces and left the design isolated without the support of further implementation plan.

### 7.1.6. Progress and results

Despite the high expectations for Dongtan Eco-city, the project got stalled with no indication of a soon resumption. So far, a wetland park covering 1.3 kilometers has finished construction in 2007 and became home to over 100 bird species. Late 2008 saw the establishment of a wind park, which went into full operation later and supports 26,000 households in Shanghai(Hefa 2010). No further progress has been made since then, putting

the plans indefinitely on hold.

High initial development costs aside, the unique conditions in Dongtan also brought more sensitive issues to the project. Located near one of the most important migratory bird sanctuaries, Dongtan has to confront the doubts and concerns regarding its ecological design. Though the plan developed by Arup can minimize the potential negative impact on the local ecological system, such a large-scale city construction will inevitably be environmentally disruptive. Moreover, the question remains of just how much Dongtan eco-city can ease the pressure Shanghai faces. Ideally the Dongtan eco-city will attract residents from Shanghai who espouse sustainable living style instead of local farmers(Hefa 2010). This, unfortunately, ignored the land conservation policy in China. In order to guarantee enough agricultural land for self-sufficiency in food, the Chinese government has established stringent policy stipulating the requisition of cultivated land must be compensated by land users reclaiming the same acreage of arable land(Hefa 2010). Dongtan is originally one piece of land meant to compensate the arable land lost due to urbanization in Shanghai, therefore the vision of building an eco-city in Dongtan has violated this policy right from the beginning. Although SIIC was assigned the operation rights, the land was still possessed by Chongming County. Such large scale land development involved in the project made it almost impossible to get the construction permit issued by the State Council.

It could be relevant to take a look into the agricultural land conservation policy in China. China's economic growth in the past 30 years has taken a toll on the countryside: many environmental and social problems have unfolded during the process. One of the most severe problems is agricultural land destruction. More and more agricultural has been converted into urban or industrial uses via legal and illegal means, resulting in a serious threat to the food security in China, along with increased agricultural pollution and large number of landless migratory workers. As a response, China established stringent cultivated land protection policies stipulating the requisition of cultivated land must be compensated by land users reclaiming the same acreage of arable land(Hefa 2010). This was echoed by the 12th Five-Year Plan (2011-2015) which identifies safeguarding of the nation's food security as China's 'primary goal'. Law of the People's Republic of China on Rural Land Contracting in 2002 stipulates that land owned by an agricultural collective first needs to be converted by the local Land Administration Authority via eminent domain to industrial use in order to be developed. To do this, it has to go through a multiple-layer approval system from the town up to the provincial level. It is just the hierarchical approval system that sometimes induces a cycle of corruption. Some powerful local officials may be induced by local economic development even when their interests are not aligned with the central government's policy. The negative environmental and



social impact brought by the corruption in agricultural land transfer had forced the central government to take drastic actions. Stricter control has been taken over provincial land administrations. In order to curb the dwindling of arable land from urban and industrial construction, China has adopted a land quota system aiming to retain 120 million hectares of "redlined arable land" until 2020. In this way, local governments are restricted by the land quotas allocated by the Ministry of Land and Resources. To further dissolve the incentives for corruption and illegal expropriation, the 2008 Decision and Rural Contracting Law allows farmers to contract directly with developers to transfer their land use right, hoping to raise development prices and give peasants more say in the development (DuBose 2010). In the case of Dongtan, the project is also subject to the land quota system. However, the problem wasn't quite sorted out in the beginning. Though the land was in principle agreed for Dongtan eco-city development, it would still need to take up the land quota of Shanghai municipal government. One might wonder why this was not deemed as a major issue earlier. That relates to the strong support from Shanghai's former mayor Chen Liangyu. With his prestige lent in the initiative, the issue of land quotas was not considered as an obstacle until his imprisonment for corruption. This can be quite an example to understand the crucial role of some key local officials in urban planning and development within the so called "fragmented authoritarian" political system in China. It also reflects the latent conflicts between central and local governments and the need for policy coordination at the beginning of urban development projects.

In addition, targeting at higher-level residents instead of local farmers allude to social exclusion in the project. In urban development project it is important to give priority to public interest and respect the stake of all social groups. Local farmers as an important group of stakeholders who are directly affected by such a scheme should be consulted and properly arranged for, so that the plan would be more realistic and executable at the grass-root level. It is crucial that a more bottom-up approach should be used during the planning phase to make sure the developed goals represent the needs and wants of the involved stakeholders. Perhaps this is even more essential for sustainability to be embraced and materialized in the context of China where top-down policy making system dominates. An incident in 2006 when the former mayor of Shanghai was arrested for corruption and fraud stroke a blow at the project. The political tremor caused by the scandal had its ripple effect on the project with the sharpened tension between central and Shanghai municipal government. This may emphasize the need for more bottom-up supports and plea for sustainable urbanization efforts instead of heavy reliance on individual advocates in the political system.

Following the discussion above, another important topic that needs to be addressed is how to define the success and failure for such an eco-city project. For Arup, it has come up

with an integrated urbanism plan by taking environmental, social and economic sustainability into consideration (Hefa 2010). The design itself has followed the general principles for eco-city development; contextual information such as the cultural and social history was also added as ingredient for this tailor-made master plan. Although some study has pointed out that the commercial model Arup envisaged for Dongtan is a rather risky one which heavily depends on the success of Dongtan Institute for Sustainability, it is now difficult to assess its viability without actual progress of the project. As a pioneering eco-city initiative in China, it has gained a lot of valuable experience and lessons in network building and support gathering, thereby setting an example for many Sino-foreign eco-city development projects in China. Due to the high media exposure it has received, the concept of eco-city was more widely learnt about among the public and the awareness building of sustainability has paved the way for later eco-city endeavors. The discussion, speculation and even criticism revolving the Dongtan project provide some insightful views for future sustainable urbanization attempts in China. In this sense, it has opened the door for further explorations in Sino-foreign eco-city development.

#### **7.1.7. Identified critical success factors in collaboration**

Based on the case study on Dongtan Eco-city, the critical success factors can be identified as resource interdependencies and capacity potential. The negative or insufficient factors undermining the collaboration are mismatch of expectations, unbalanced power positions on the two sides and the expected loss of key project advocate.

### **7.2. Features of Sino-British collaboration**

#### **7.2.1. Client-designer type of collaboration**

Dongtan Eco-city can be seen as client-designer of type collaboration between SIIC and Arup. Dongtan project was initiated before Arup's engagement. At that time, Dongtan was meant to be developed into a high-end residential area away from the roar of the metropolis. However, the concern of central government about the wetland there prompted SIIC to look for a way to make urban development compatible with ecological environment preservation. Arup's expertise in built environment attracted McKinsey's attention, which was also under a contract with SIIC for the selection of project partners. With McKinsey's recommendation, SIIC awarded Arup a contract for the master plan of Dongtan with a focus on preservation of the wetland there. Based on the field investigation, Arup concluded that Dongtan cannot

effectively function as a commuter town. With the emphasis on ecological preservation, Arup resorted to the eco-city concept and made an innovative master plan for Dongtan Eco-city. Since SIIC was entrusted by Shanghai municipal government to be solely responsible for appointing companies to the project, Arup's engagement was not even directly solicited by Shanghai Municipality. This was a rather extreme form of client-designer type of collaboration in eco-city development.

### **7.2.2. Symbolic support from national leaders**

Though Dongtan Eco-city was praised as an exemplary collaboration between UK and China by two former British Prime Ministers Tony Blair and Gordon Brown, there was no direct involvement of national governments from either China or UK. The symbolic support came after the collaboration was formed. On those occasions Dongtan Eco-city was mentioned as a highlight project to illustrate the thriving cooperation between the two countries. The symbolic support may have helped Dongtan to gain wider attention and to establish a network of partnerships with many international institutes, but couldn't save the project from the infinite on-hold fate.

### **7.2.3. International partnership network**

The international orientation of Arup and the innovative nature of Dongtan Eco-city have attracted many research institutes and commercial banks. Among them HSBC and the UK investment bank Sustainable Development Capital LLP (SDCL) are especially noteworthy. Although project was dropped half way before the planned long-term partnership could go into effect, the participation of international banks in Chinese eco-cities still indicated the possibility of external financing channels. In addition, the Dongtan research network established also was meant to encourage the participation of knowledge institutes and develop an international research community around spatial master planning in the specific context of Dongtan.

### **7.2.4. Exclusive focus on urban planning**

As can be observed from the organizational chart, there was no technology companies involved in Dongtan Eco-city project. It was mainly focused on real estate development with the urban planning expertise of Arup. This may as well be the evidence showing the strongly commercially-driven nature of the project instead of a truly eco-city initiative.

## 8. Shenzhen International Low-carbon Town

### 8.1. Background

Shenzhen is a coastal city of 2020 km<sup>2</sup> in southern China. It is situated on the east bank of Pearl River Estuary, and is adjacent to the metropolis Hong Kong. In 1980 Shenzhen was designated as China's first Special Economic Zone together with three other cities (Zhuhai and Shantou in Guangdong Province, and Xiamen in Fujian Province). Since then, Shenzhen has experienced rapid development thanks to the policy institution of "reform and opening" in the late 1979. In only 30 years, Shenzhen has transformed from a small town in remote southern China with a population of about 30,000 in 1979 to a modern industrial city with a population of over 10 billion in 2010 (Shenzhen Government Online 2010). Rapid investments from both Chinese and foreign nationals result in Shenzhen's modern cityscape and vibrant economy. Nowadays Shenzhen is one of the most developed cities in China with high-tech and manufacturing industries as the backbone of its economy. Shenzhen is the home to some of China's most successful high-tech companies such as BYD, Hasee, Huawei, JXD, and Tencent (de Jong et al. 2012).

However, during the past years asymmetrical levels of development have been observed inside and outside of the SEZ in Shenzhen. Despite geographic adjacency, the GDP per capita outside the SEZ is a fifth compared to the GDP per capita inside (Hoening et al. 2010). Shenzhen's central districts like Futian, Nanshan, Luohu and Yantian are ranked among the wealthiest districts in China. In contrast, most areas outside SEZ had a heavy reliance on almost purely manufacturing industries (IT Industry, machine hardware, furniture, clothing, chemical industry, etc) They have a structurally unsustainable development pattern and are lagging behind in production processes, management and environmental awareness (Kromhout 2010). Moreover, like many developed cities in China, Shenzhen also faces the challenge to maintain local GDP growth at a high level. In order to achieve the target indicators, many Chinese cities resort to urban expansion by turning peripheral areas into new development districts. The positive climate of China's real estate market and the move-in of companies can contribute significantly to the local economic growth. Thus driven by the impetus of achieving continuous high economic growth rate, as well as the intention to reduce the asymmetric development state in local central and peripheral areas, Shenzhen municipal government applied for an expansion to include Longgang District in the SEZ together with Bao'an District. This was approved by the State Council in July 2010 (Shenzhen Daily 2010).

Located in the northeast of Shenzhen, Longgang District is its biggest district with a total jurisdictional area of 385.94 km<sup>2</sup> (Longgang Government 2011). It borders Luohu District, Yantian District and Hong Kong on the south, Huizhou and Dongguan on the north. Compared to other districts formerly included in SEZ of Shenzhen, Longgang District is relatively less economically prosperous. However, Longgang owns more spatial resources which are become increasingly important in economic development and thus has considerable potential yet to be tapped. In fact, over the years Longgang has become one of Shenzhen's industrial zones hosting many high-tech companies, advanced manufacturing and traditional competitive industries, logistics and financial service industries(Longgang Government 2011). The potential in the spacious Longgang District prompted a strategic vision by both Shenzhen municipal government and Longgang District government of shaping Longgang into a sub-center of Shenzhen(Longgang Government 2011). Longgang is expected to be a high-tech industrial area with first-class infrastructure, management and businesses(Kromhout 2010). In the new development plan envisioned by Shenzhen municipality and Longgang District government, Pingdi is going to bear the brunt of sustainable urban development and become a high-tech and environmentally-friendly town.

There are in total 13 sub-districts under Longgang and Pingdi is one of them. Located in the central cluster of Longgang District, Pingdi Town has a surface area of 53.14 km<sup>2</sup> and is about 60 km away from the city center of Shenzhen. Currently Pingdi has a population of around 168,000, among which half are permanent residents(Kromhout 2010). Many large industries can be found in Pingdi area, which include metal plating, plastics, electric plates, solar panel, packaging materials and glass industries(Hooning et al. 2010). These traditional manufacturing factories pose serious concern over pollution problems in Pingdi. Most of the inhabitants in Pingdi are temporary immigrants from other parts of China and their annual income is far below the average figure of Shenzhen.

## **8.2. Shenzhen International Low-carbon Town in Pingdi**

Since Longgang District borders Huizhou and Dongguan on northeast and northwest respectively, Shenzhen's expansion plan will influence Guangzhou Province on neighboring cities of Xinxu and Qingxi especially. As a response, Guangzhou Province and Shenzhen Municipality decided to promote regional cooperation among the three cities to reduce inter-municipal competition and maximize expansion space. Five agreements on joint urban development were signed between Shenzhen and Guangdong Province in April 2011(de Jong et al. 2012). One of the agreements states that a new regional development zone of 250 km<sup>2</sup> would be established between Xinxu Town of Huizhou City, Qingxi Town of Dongguan City and

Pingdi Town of Longgang District (Ping-Qing-Xin). The three towns are planned to join forces and build a new prosperous area both in terms of economic development and ecological sustainability.

Initially local planning institutes are engaged for the master plan for Pingdi Town in Ping-Qing-Xin development zone. However, Shenzhen municipality and Longgang District were dissatisfied with their planning and found them mediocre and not innovative enough. Shenzhen Municipality and Longgang District government subsequently invited a Sino-Dutch team consisting of academic parties including the Harbin Institute of Technology Shenzhen Graduate School, the Next Generation Infrastructures Foundation (closely related to Delft University of Technology), and the a Dutch architecture institute Dynamic City Foundation, to write a spatial master-plan for the Ping-Qing-Xin area with a focus on Pingdi. After the submission of a report named “Developing a Spatial ECO-2-ZONE at the Intersection of Three Cities” in March 2011, the researchers received approval from Longgang District government and support from the Vice-Mayor of Shenzhen. The positive response from Shenzhen was followed by an official request to Dutch Consul General in Guangzhou for an official government-to-government collaboration in further planning and implementation of Low-carbon Town in Pingdi. As a response, the Dutch Vice-Premier sent an official letter to the Chinese Minister of Science and Technology for recommendation of the project. Shenzhen government also subsequently paid two high-level visits to the Netherlands and there they were impressed with the Dutch experience in ecological protection and urban development. The positive report they submitted to the National Development and Reform Commission (NDRC) elevated the project to the national level: Pingdi Low-carbon Town was listed among the national pioneering low-carbon eco-city projects together with seven other cities(de Jong et al. 2012). The project was officially renamed as Shenzhen International Low-carbon Town.

Following the proposal of the Dutch Vice-Premier, an expert meeting was held in Shenzhen with the attendance of experts, policy makers and industrial companies from both China and the Netherlands in December 2011. Shenzhen Vice-Mayor, NDRC representatives and many key officials from Shenzhen and Longgang government welcomed the Dutch delegation headed by former Secretary-General of the Ministry of Infrastructure & Environment. Officials from Dutch Ministries of Infrastructure & Environment and Economic Affairs, Agriculture & Innovation, as well as city representatives from Amsterdam, Rotterdam and Eindhoven were also on the Dutch delegation. Topics including urban planning, energy, infrastructure development, transportation, knowledge infrastructure and governance were extensively discussed by the participating parties(NOST China News 2011). The first official Sino-Dutch collaboration document for Shenzhen International Low-carbon Town including 19

action points was signed between the two delegations through the three-day expert meeting(de Jong et al. 2012). Half a year later, June 2012 saw the second expert meeting take place in Shenzhen. 50 experts from Chinese and Dutch institutes, companies, and local and national governments attended the meeting. Through discussions two focus areas were identified as the next step of the collaboration: the set-up of a Sino-Dutch workshop for detailed review of the master plan, and the initiation of joint pilot projects before September 2012, marking a concrete step forward for further collaboration in Shenzhen International Low-carbon Town (NOST China News 2012).

### **8.3. Analysis**

In this section an analysis on the Sino-Dutch Shenzhen Eco-city will be made using the proposed theoretical framework of factors influencing collaboration. In this case since the collaboration is still taking shape, some factors haven't been decided yet. And those to-be-determined factors provide potential space for improvement in the following course of collaboration. Based on the analysis, discussions will be made regarding what a suitable institutional arrangement should look like to facilitate the coordination between participating parties and to maintain a stable collaboration along the way.

#### **8.3.1. Political relation and economic connections**

China and the Netherlands have maintained sound momentum in bilateral relations over the years. There are frequent high-level bilateral visits between the two countries, and the political mutual trust is also further strengthened with deepened exchanges in various fields. This year also marks the 40th anniversary of diplomatic ties between the two countries. In May 2012, chairman of the Standing Committee of China's National People's Congress Mr. Wu Bangguo paid an official visit to the Netherlands and expressed his intention to enhance the bilateral relations and parliamentary exchange. This vision was shared by the Queen Beatrix of the Netherlands, both agreed that the bilateral relations is at a new starting point and will be elevated to a higher level with joint efforts(Zhao and Zhou 2012).

In terms of economic connections, the Netherlands has been China's second biggest trading partner and export market among EU nations for nine consecutive years(Li 2012) Currently there are roughly 2000 Dutch companies established in China. China in turn maintained the top trade partner of the Netherlands in Asia. Despite the recent global economic and financial crisis, the bilateral trade between the Netherlands and China still stroke a record high of USD 68.15 in 2011 (MofCOM 2012). In May 2011 during the Dutch Minister of Economic Affairs, Agriculture and Innovation's visit to Beijing, a cooperation

agreement was signed to promote reciprocal investment. These can give an indication of the tightening economic and trade ties between the two countries.

At the local level, there are also active trade activities between the Netherlands and Guangdong Province, where Shenzhen is located in. According to the statistics from Dutch Consul General in Guangzhou, Guangdong imported USD 883 million goods from the Netherlands and exported USD 8,641 million goods to the Netherlands. Among the EU nations, the Netherlands ranked No.5 investor in Guangdong in 2008(Holland in China 2012). These can give an indication of the good economic and trade climate between Guangdong and the Netherlands.

### **8.3.2. Goals and resources of collaborating parties**

Being the most spacious district in Shenzhen, Longgang District is facing a new development opportunity arising from the expansion plan of Shenzhen. With the agreement of joint development of Ping-Qing-Xin area, Pingdi Town in Longgang District is envisioned to become an industrial town following the principles of eco-friendly and sustainable development. A special emphasize on the realization of both industrial development and ecological preservation was clearly set out in the goals of Pingdi Town. Longgang District government has decided to initiate Pingdi as the start-up area and prove Shenzhen's determination in cutting back GHS emissions. Situated in one of the most developed cities in China, Pingdi is an ideal test ground for eco-concept and innovations. With the backup of Shenzhen municipal government, Longgang District has confidence in gaining sufficient financing channels to support the Ping Eco-city initiative. However, they realize that the urban planning for an eco-city requires more expertise and experience that are beyond the capacity of local planning institutes. The green technological solutions for an eco-city are also the resources they need to reach out for.

In this case, Longgang District government has turned to Dutch academics and architects for their planning and architectural excellence. With the master-plan jointly developed by Harbin Institute of Technology Shenzhen Graduate School, the Next Generation Infrastructures Foundation, and Dynamic City Foundation, Longgang was able to get into contact with more Dutch experts and tap into their knowledge and experience. More importantly, with the efforts of garnering political support from both sides and set up collaboration in this project, Shenzhen Low-carbon Town in Pingdi has gained further momentum with indicated cooperation interests from a number of Dutch government agencies, companies and institutes. A comprehensive stakeholder analysis made by Professor Martin, who is also one of the



initiators of the collaboration project, has systematically mapped out the resources that can be mobilized for the collaboration in Pingdi Low-carbon Town and the goals of potential participating parties on the Dutch side.

For the Netherlands, the primary potential in this project is the opportunities it offers for Dutch businesses in urban planning and green technologies. The major interest for Dutch companies in the project is to exhibit their expertise in this signature project and to further explore more opportunities in the Chinese market. They expect to get quality and reputation out of the projects while still make them profitable. These companies will be the service providers with their expertise in urban planning, sustainable building, and technological solutions to the project.

Except for promoting Dutch businesses in one of the most developed Chinese cities of Shenzhen, the Dutch government also expects to achieve a good result in reducing energy consumption through this international cooperation project. Such a highlight project will serve as an exemplary cooperation in new areas between China and the Netherlands and prove the value of Dutch urban planning expertise in helping China shaping its sustainable urban agenda. Through such an experience, the Dutch ministries may also accumulate valuable experience which in turn can be applied elsewhere. Government agencies with relevant knowledge like the Ministry of Infrastructure & Environment can offer consultation to Longgang government, but no public financial resources were available to commit to the project.

Some Dutch local governments also show potential interests in joining the collaboration. Amsterdam has extensive experience from projects in Shenzhen on the theme of smart city development and thus sees the project as a progression of its collaboration with Shenzhen. Almere as a new town can also contribute its experience in building a new city from scratch to the project. Eindhoven's experience in smart city can also help Pingdi develop a knowledge-based economy. Delft is a friendship city of Shenzhen and the relationship was strengthened during the recent years. Thus Delft is also expected to join the collaboration in Shenzhen International Low-carbon Town though with a minor role compared to the aforementioned cities. These cities wish to develop long-term relationships with Shenzhen and to further strengthen economic connections and mutual investments.

### **8.3.3. Political support**

Shenzhen International Low-carbon Town in Pingdi has received the support from the National Development and Reform Committee (NDRC) and was listed among eight national

pioneering low-carbon eco-city projects. The Vice Mayor of Shenzhen also pledged support for the project and encouraged Longgang District government to learn from Dutch practice in sustainable urban development.

On the Dutch side, the ministries of Economic Affairs, Agriculture & Innovation, and Infrastructure & Environment already joined the expert meeting and expressed the importance they attach to the project. The Dutch Consul General also played an active role in recommending the project to Dutch governments and facilitating the communication between relevant parties in Shenzhen and the Netherlands. In addition, the Sino-Dutch Joint Economic Committee agreed to deepen cooperation in the development of sustainable cities, and the Sino-Dutch Shenzhen Eco-city project was regarded as an important component.

## 9. Collaboration design based on lesson drawings

### 9.1. Contingencies applied to Sino-foreign eco-city collaboration

In order to systematically draw lessons from pervious Sino-foreign eco-city collaborations that can be useful for the Sino-Dutch Shenzhen Low-carbon City, it is essential to first identify the contingencies applied in the this comparative study. By applying the contingencies proposed by Rose to the context of bilateral collaboration in eco-city development, the following specific contingencies can be derived as follows: degree of uniqueness of Sino-foreign collaboration in eco-city development, the availability of resources from collaborating parties, the interdependency between eco-cities compared, the complexity of bilateral collaboration in eco-city development, the scale of change an eco-city initiative involves, the proximity of bilateral institutions compared, and their values.

To start with, international engagement in eco-city development s a common practice across the world. As a matter of factor, it is even one of the driving factors of eco-cities according to Simon Joss. There are already quite a few Sino-foreign eco-city initiatives in different parts of China. Therefore Sino-foreign collaboration in eco-city development is rather pervasive than unique. Moreover, the Chinese context and the globalization trend have created interdependencies between these Sino-foreign eco-city initiatives. Chinese local governments are faced with the common goals of economic development and reduction in GHG as is stipulated in national policies. On the other hand, globalization has also stimulated the cross-region and cross-country learning among both local governments and their international partners. Besides, most of the Chinese eco-cities are initiated by local governments or even national governments and are hosted in relatively wealthy regions with more or less similar political systems. In this way, they generally share the necessary resources required in eco-city development. With the three contingencies satisfied in general, potential for lesson drawings on Sino-foreign eco-city collaboration exists. Previous experience relevant for Sino-Dutch collaboration in Shenzhen International Low-carbon City will be learnt from different cases based on the specific contingencies satisfied.

In the following section positive and negative lessons in Sino-foreign eco-city collaborations are drawn systematically from the eight case studies, which will then shed light on ideas about what a viable Sino-Dutch collaboration should look like.

## **9.2. Steps for lesson drawings**

Applying the procedures for lesson drawings prescribed by Richard Rose to this study, here the experience from eight selected Sino-foreign eco-cities will be presented systematically as follows.

### **9.2.1. The programme: bilateral collaboration in Chinese eco-city development**

According to the definition by Rose, a programme is an instrument of public policy aiming to achieve certain policy intentions. In this study the programme refers to bilateral collaborations in Sino-foreign eco-cities. It ranges from simple contracting relationship between foreign companies to complicated government-to-government collaborations. Though the form and degree of collaboration vary across the Sino-foreign eco-cities, the engagement of international partners and the role of bilateral collaborations in Chinese eco-city development is the topic of this study and will be approached through the proposed sub-questions.

### **9.2.2. Catch the attention of policy makers**

Eco-cities are usually initiated by local cities and the observation from eight selected Sino-foreign eco-cities has confirmed this finding. Therefore, local policy makers are already aware of eco-cities as a sustainable urban solution to tackle environmental problems. The relevant issue here is to raise the awareness of launching bilateral collaborations to support eco-city initiatives among policy makers. Usually the demand for resources and capabilities outside a city propel local policy makers to reach out for assistance from foreign partners. Except for the existing economic connections, regular or frequent academic and professional exchange of ideas can also help to catch the attention of policy makers and bring about bilateral collaborations in eco-city development.

### **9.2.3. Scanning programmes elsewhere**

As is pointed out by Simon Joss, international engagement has become a commonality in many eco-cities across the world. Among them there are internationally renowned projects like Masdar City in Abu Dhabi, Sino-Singapore Tianjin Eco-city and New Songdo City in South Korea. In the scope of this study in order to draw relevant lessons for Sino-Dutch collaboration in Shenzhen International Low-carbon city, the focus was on Sino-foreign eco-cities to narrow down the context of eco-city development in China.

#### **9.2.4. Learn by going abroad**

In this study experience of international partners in Sino-foreign eco-cities will be examined for the Sino-Dutch collaboration in Shenzhen. In this way the search scope is varied both in terms of physical locations of Sino-foreign eco-cities and the participating foreign partners. So far a number of countries including Singapore, Sweden, Germany, Finland, UK, Denmark, etc have either launched bilateral collaborations in Chinese eco-city development or started explorations on possible cooperation projects (see Appendix A). Some of these projects have already achieved preliminary results and their positive experience will be analyzed and drawn upon based on the contingencies satisfied. Even those Sino-foreign eco-cities in the start phase could provide some inspirations for the Sino-Dutch collaboration under study. There are also negative lessons from on-hold project like Dongtan, from which warning messages can be taken. For this purpose, the study has selected eight Sino-foreign eco-city projects shown in Table 1.

#### **9.2.5. Abstract a generalized model of how a foreign programme works**

In this part, experience from previous Sino-foreign eco-city collaborations will be generalized into a number of heuristics for institutional transplantation. The approach of contextualizing a lesson to the institutional setting used by de Jong and Stoter provided a framework for lesson drawings for Sino-Dutch collaboration in Shenzhen International Low-carbon Town under study (de Jong and Stoter 2009). The generalized heuristics represent different aspects of bilateral collaborations in eco-city development that are worth learning from. It should be noted that these heuristics are majorly drawn from the eight selected cases, thus lesson drawings can only be effective when relevant contingencies are satisfied and necessary adaptations are made.

##### **Heuristic 1. Establish a supervisory mechanism for the collaboration**

In Suzhou Industrial Park and Sino-Singapore Tianjin Eco-city, a two-level supervisory framework consisting of Joint Steering Committee and Joint Working Committee was established between national and local governments of both countries to drive the cooperation. Similarly, in Wuxi Sino-Swedish Low-carbon Eco-city, a Joint Steering Committee and a Joint Technical Committee were established between Wuxi municipal government and Swedish government and leading companies.

In SIP and SSTECH, the two-level supervisory mechanism represents the highest level of government-to-government collaboration. There is national strategic interest in these

collaboration projects and Singapore has made considerable commitment and resources into them. Moreover, these supervisory committees have control and command over the joint ventures established between the two countries. The dominance of government-owned or government-link companies in both consortiums ensured the influence of both governments over joint ventures and thus laid solid foundation for bilateral collaboration.

Sweden on the other hand is also less ambitious in the sense that it sees the collaboration more as an opportunity of knowledge and technology transfer instead of government-dominated investment initiative. Nonetheless, it attempts to build a more stable and lasting relationship with the collaborating government by adding more formality into the organizational arrangement. By designating relevant government agencies and leading company representatives into the Joint Steering Committee and Joint Technical Committee, more regular communication channels can be created between various parties on both sides and thus promote their cooperation and engagement. It could be also considered as a gesture of importance and commitment they attached to the collaboration.

## **Heuristic 2. Designate relevant government agency for the collaboration**

In Sino-Swedish collaborations the Swedish Consul General and Center for Environmental Technology (CENTEC) have played an active role in promoting the formation of bilateral cooperation and bringing in Swedish companies into these projects. They are also consistently involved during the collaboration process as facilitators and promoters. In the case of Qingdao Sino-German Eco-park, the Federal Ministry of Economics and Technology (BMWi) initiated the project and served as the counterpart of Ministry of Commerce on behalf of German and Chinese governments respectively. BMWi is also responsible for arranging regular visits of German enterprise delegations to Qingdao Eco-park and encouraging their participation.

Dedicated government agencies have also been observed in Sino-Singapore collaborations. In Guangzhou Knowledge City, the Singaporean Ministry of Finance is the leading on the Singapore side and act as the counterpart of Guangdong Provincial government. In Sino-Singapore Tianjin Eco-city, a network of Singaporean government agencies were involved in different collaboration areas of the project. Designated government agencies make the organizational structure clear with established communication channels with collaboration partners. The accountability accompanied is also regarded as a sign of confidence and significance they attached to the cooperation project, therefore contributing to the stability of collaboration.

### **Heuristic 3. Make full use of existing bilateral cooperation platforms**

Following the analysis on Swedish and German experience in the “market-driven, government-promoted” collaboration approach, one key enabling element is the presence of existing bilateral cooperation platform. Sweden and China have a relatively long history of cooperation in sustainability field, and they jointly presented the SymbioCity concept at the World Summit on Sustainable Development in South Africa in 2002. A series of sustainable cooperation agreements established at the national level also provide a solid foundation for more eco-city collaboration projects. Wuxi is a traditional stronghold of Swedish companies and has well-developed cooperative relationships to strengthen bilateral collaboration. In the case of Caofeidian International Eco-city, the Swedish eco-city Malmö which is the model city in the master plan of Caofeidian, is also the sister city of Tangshan. Therefore, the multi-level partnership helped to stabilize the bilateral collaboration in eco-city development. Qingdao Sino-German Eco-park has also benefitted from the recent inter-governmental consultation mechanism and a series of cooperation agreement in environmental technology between China and Germany.

Similarly, in Guangzhou Knowledge City the established Singapore-Guangdong Collaboration Council (SGCC) also assigned a Knowledge City Project Working Committee to support the project. The regular dialogues between Guangdong and SGCC were utilized to facilitate promotion and coordination for Guangzhou Knowledge City, and in turn the platform was strengthened and substantiated by the flagship collaboration project.

### **Heuristic 4. Properly package resources and capabilities**

Another observation from the case studies is the package solutions offered by foreign parties. In Sino-Singapore Tianjin Eco-city various relevant government agencies are involved to offer consultation in their expertise areas. A Singapore Ministerial Committee consisting of related ministers and government agencies was set up to provide packaged planning and implementation advice for the eco-city development. The consortium based JVs also constitute the vehicle to bring in integrated resources and capabilities. In comparison, in Wuxi Sino-Swedish Low-carbon Eco-city the Swedish side also intends to bring both their urban planning expertise and environmental technology into the collaboration. With the assistance from CENTEC and Joint Technical Committee, they also bundle up these resources into integrated solutions. The Chinese cities may as well welcome such integrated solutions which help them to save more coordination efforts and speed up the progress of such large-scale project. Packaged solutions also give the cities/towns a stronger identity with more authentic

style of the foreign partners, which can be desirable for both sides.

#### **Heuristic 5. Make clear focus areas of collaboration**

Eco-city as a loosely defined concept can be interpreted in many ways. However such flexibility also impaired its implementation capacity. In the collaboration formation phase it is even more crucial to identify the scope of collaboration areas. For example, in Sino-Finnish Mentougou Eco-valley the eco-restoration master planning is the center of collaboration. For Qingdao Sino-German Eco-park environmental technology transfer is the main theme. It also clarified the collaboration mode of cooperative development of a German center in the eco-park, and joint projects by German and Chinese enterprises. It is the same case in Sino-Swedish collaborations. In Caofeidian International Eco-city, the Swedish partner primarily contributed their master-planning expertise; while in Wuxi Sino-Swedish Low-carbon Eco-city more intensive collaboration has been tried out in this small scale project. Though this time the collaboration area was expanded to both urban planning and technological solutions, the reduced project scale eased the complexity and allowed both sides to explore suitable collaboration mechanism that can be extended on a larger scale in Wuxi later. By identifying clear focus areas of collaboration, both sides can develop a common vision, work out executable strategies, and avoid being drowned in diffuse discussions on a long list of topics.

#### **Heuristic 6. Encourage the participation of knowledge institutes**

As can be observed in Sino-Singapore collaborations and Sino-Finnish Mentougou Eco-valley, research and education institutes have an active presence in the collaborations. In Sino-Singapore Tianjin Eco-city, National University of Singapore partnered with relevant Chinese parties to establish a college offering high-quality and research and graduate programmes. In Guangzhou Knowledge City three Singapore universities joined the collaboration to develop a local talent pool. In the case of Sino-Finnish Mentougou Eco-valley, the collaboration was initiated by Finnish research institute VTT and influential Finnish scholars. The earliest example of Sino-foreign eco-city collaboration in Dongtan also built up a remarkable international research network, though they didn't actually have a chance to go into effect due to the expected suspension of the project. This commonality of including knowledge institutes as part of collaboration program invites the question of what benefits knowledge institutes can bring to the development of eco-cities, and detailed discussions are made in the appendix of the paper. In general, knowledge institutes can create job opportunities in associated areas and promote local employment. They also help to create a talent pool which further attracts knowledge-intensive industries. The presence of



education/research institutes may also generate synergy in fostering technological innovations in the region. Well-established knowledge institute can encourage spin-off businesses around it, thus creating spill-over effects in its vicinity. Through the education institute the environmental awareness can also be raised among the younger generation of local residents.

#### **Heuristic 7. Start with small demonstration project to maintain the momentum**

Eco-city development initiatives require long-term commitment and enormous resources, thus pose great uncertainties for collaborating parties. It is difficult to develop a sound and practical collaboration overview right from the beginning, therefore a small demonstration project may be desirable to give both sides a learning process and develop mutual trust and shared visions with each other. Some Sino-foreign eco-city practices have already adopted this strategy. In Qingdao Sino-German Eco-park, a German Center has already started construction and will be completed in 2014. The German Center is based on an agreement between Qingdao government and the German Center Shanghai. It will introduce advanced technologies and management practices in various sectors, as well as provide office space, consultancy services and a startup company incubator for German enterprises. Wuxi Sino-Swedish Low-carbon Eco-city was even more a case in point. The eco-city itself is a demonstration project in Taihu New City. Both Wuxi government and Swedish partners are hoping to make the collaboration project a success and then replicate it in other parts of Taihu New City.

#### **Heuristic 8. Focus on the local level of cooperation**

Most of the Sino-foreign eco-city initiatives have gained the recognition from central government with varying forms and degree of political support. High-level support allows these initiatives to access more resources and help to attract more participating parties. However, in these city-based eco-city initiatives, it is the local governments stand at the frontline of urban development. These entrepreneurial cities have considerable financial and administrative autonomy and were capable of taking the leading role in eco-city development. While introduction and approval from central government can accelerate the progress and prevent projects from waiting on a long list, local governments are the ones foreign partners will work closely with and address various issues through discussions and negotiations. Moreover, it is important to have the local governments and partners in the driver's seat. Foreign partners and national governments offer external facilitation and right expertise for certain undertakings, however the ownership should be given to local governments. In collaboration design it is crucial to guarantee local ownership and encourage participating

parties to have direct and consistent communication with local governments. In Suzhou Industrial Park the Singapore consortium paid their price for resorting to high-level dialogue and cornering their Suzhou counterparts into favorable decisions for them. Thus mistrust and conflicts of interests surfaced and later resulted in SIP's bitter competition with SND, which became a negative lesson for later bilateral collaborations to take warning from.

#### **9.2.6. Turn the model into a suitable lesson**

Based on the heuristics of lesson drawings from the eight case studies, this research aims to provide some implications for the Sino-Dutch collaboration in Shenzhen International Low-carbon Town. Here the propositions are intended to offer some useful insights for the collaboration mechanism design. It serves as a foundation for more extensive and empirical research to flesh out the details for collaboration arrangements. When applying the heuristics concluded above to the Sino-Dutch collaboration, the contingencies including availability of resources from collaborating parties, the complexity of bilateral collaboration in eco-city development, the scale of change an eco-city initiative involves, the proximity of bilateral institutions compared, and their values will be taken into consideration to ensure the suitability of lesson drawings for the particular project under study.

##### **9.2.6.1. Establish a supervisory mechanism for the collaboration**

It has been observed that a supervisory mechanism is conducive to the continuous development of Sino-foreign eco-city collaboration projects. Singapore has adopted the approach in both Suzhou Industrial Park and Sino-Singapore Tianjin Eco-city with joint steering council and joint working committee. However, for the Netherlands the Singaporean style bilateral collaboration is inappropriate and impractical as Singapore has a strategic national interest in the project with the commitment of enormous resources in their collaborations. Moreover, the project scales and complexities of Sino-Singapore Tianjin Eco-city and Shenzhen International Low-carbon Town are also quite different. In comparison, the two-level non-authoritative supervisory mechanism used in Wuxi Low-carbon Eco-city has offered a workable way. With the two-level supervisory boards, leaders and experts on both sides can be organized to have open and regular dialogues. More intensive and structured interactions will drive the development and implementation of shared visions. For the Dutch side, it not only assures the Shenzhen government of their commitment to the project, but also helps to call on the resources and expertise of potential interested Dutch parties.

#### **9.2.6.2. Designate relevant government agency for the collaboration**

In Huristic 2 it is argued that designated government agencies can help to stabilize bilateral collaborations as is observed in Sino-Singapore, Sino-Swedish and Sino-German collaborations. The top-level government-to-government collaboration in Sino-Singapore projects are accompanied by close involvement of many Singaporean government agencies. Again their high stake in the collaborations, abundant resources available and project scale are beyond the learning scope for Sino-Dutch collaboration in Shenzhen International Low-carbon Town. On the other hand the contingencies of availability of resources, scale of change in an eco-city, and the values of parties are quite similar in Sino-Swedish, Sino-German and Sino-Dutch collaborations. The former two styles all can be considered workable in the context of Shenzhen International Low-carbon Town. In nature, both the Swedish and German governments act as the facilitators and supporters in the collaborations. It was the foreign companies that are directly involved in the negotiations for detailed arrangements of cooperative projects. This is also what the Dutch side has in mind: to promote Dutch companies' engagement in the project and to expand business opportunities in sustainable urban development area. However, it should be noted that Swedish and German governments indeed helped to lay down the framework agreements for these collaborations. Such high level political support secured the status of bilateral collaboration and made it easier for foreign companies to enter into dialogue with local authorities. This could be a direct towards which efforts are worth trying for the Sino-Dutch collaboration in Shenzhen as well.

#### **9.2.6.3. Make full use of existing bilateral cooperation platforms**

It is always wise to look for existing resources and relationships and make full use of them in new collaboration projects. Indeed Singapore and Sweden have done so in their eco-city collaborations with China. For Sino-Dutch collaboration on Shenzhen Low-carbon City, the two sides also identify and capitalize on existing platforms. The close relationship between Amsterdam and Shenzhen may indicate some developed or evolving collaboration mechanism. Those involved in these previous cooperative activities have the experience and may also very likely have the interest in joining the collaboration. The Sino-Dutch Joint Economic Committee can also hopefully offer necessary diplomatic assistance as cooperation in sustainable area has become another highlight aspect of Dutch business development in China. Platform Duurzaam Bouwen Shanghai helps Dutch companies engaged in sustainable buildings to develop Chinese markets in recent years and is already in contact with many Dutch companies with a presence in China. Moreover, the academic exchange between TU Delft and Harbin Graduate School in

Shenzhen has opened up the collaboration opportunity and thus proved its value in making a contribution to Sino-Dutch collaborations in Shenzhen International Low-carbon Town.

#### **9.2.6.4. Properly package resources and capabilities**

Singapore and Sweden have set an example in terms of offering package solutions including urban design expertise and green technologies. For Sino-Dutch Shenzhen Low-carbon City, relevant indications can also be drawn from their experience. Though the Dutch parties do not own that abundant resources like Singapore, they do have the same wishes as Sweden to offer their knowledge and skills in terms of both urban planning and green technologies. There are Dutch companies with appropriate urban planning experience and technological solutions that want to join the collaboration, the critical issue is how to organize them properly and create a collective identity which will facilitate them to have dialogues with Longgang District government and enter into contracts. Again this may require a dedicated government agency to act as the interface between Dutch and Chinese parties, though the assistance and support they offer may vary in forms.

#### **9.2.6.5. Make clear focus areas of collaboration**

In the case of Sino-Dutch collaboration in Shenzhen International Low-carbon Town, this heuristic implies that a vague agreement on scope and areas of cooperation should be avoided. In order to have a smooth progress, both sides should identify the focus areas of collaboration in the early phase and contribute their most potent resources and capabilities, adjust their expectations through these core collaboration projects. This is probably even more important in the case of Shenzhen, as the development of Pingdi Low-carbon Town involves multiple levels of cooperation in both local context and Sino-Dutch collaborations. The complexity of themes in eco-city development may especially challenge both sides in matching their expectations and resources. As much as a comprehensive and well-rounded eco-city is desirable, it may be more advisable to first focus on the major collaboration areas and scale up later. Clearly established focus areas of collaboration can help to dissolve the confusions and help collaborating parties to set up their mind and enter into collaboration on substantive issues.

#### **9.2.6.6. Encourage the participation of knowledge institutes**

The formation of Sino-Dutch collaboration in Shenzhen International Low-carbon Town and the origin of Sino-Finnish Mentougou Eco-valley especially mirror this finding. It was a

Sino-Dutch team consisting of academic parties from both countries that developed the spatial master plan for Ping-Qing-Xin area, which later gained the approval and support of Shenzhen government and elevate the Pingdi Town to a national level Low-carbon City demonstration project. The Dutch institutes have rich knowledge in sustainability field, and some of them already built close relationship with local partners (like Harbin Institute of Technology Shenzhen Graduate School and the Next Generation Infrastructures Foundation). These well developed academic ties can help Dutch parties to better understand the contextual information about their Chinese partners, and add momentum to the collaboration process.

#### **9.2.6.7. Start with small demonstration project to maintain the momentum**

The slow start of Sino-Dutch Shenzhen Low-carbon City may as well emphasize the necessity of first zooming in and selecting demonstration projects for both parties to get organized and start to take concerted actions in realizing an attainable goal in a short time span. Currently Dutch experts are already engaged in reviewing the existing master plan and a few pilot projects of retrofitting buildings by the riverside. A smart port was also under discussion with the involvement of Amsterdam, Eindhoven and some knowledge institutes. The discussion on the roles of national government and various private parties in these demonstration projects will hopefully help both sides to make clear their expectations and to dissolve their disagreements and make a start in the early phase.

#### **9.2.6.8. Focus on the local level of cooperation**

The important role of entrepreneurial cities has been emphasized in eco-city development, and this heuristic again prompts foreign partners to engage in local level communications and cooperation. For Sino-Dutch collaboration, Shenzhen has sufficient resources available and was given considerable administrative and economic autonomy. Thus for Shenzhen, the goal of reaching out for higher level political support is to gain recognition and political support. In turn the Dutch parties may as well expect a fundamental agreement between Dutch and Chinese governments to help them secure the collaboration status and create entrance opportunities in the development of Shenzhen International Low-carbon Town. Focusing on the local level collaboration with Shenzhen is both essential and favorable for Dutch parties as they have more economic connections. Shenzhen has appreciated the efforts made by the Dutch partners in the early phase and is ready to encourage more extensive participation of Dutch parties. It is in the bilateral interactions with Shenzhen where Sino-Dutch collaboration opportunities originate, and will continue to arise during the

development course.

### 9.3. Proposed collaboration alternatives

Based on the lesson drawings from previous Sino-foreign eco-city collaboration experience, the study here propose two collaboration alternatives which try to give suggestions for what a viable Sino-Dutch collaboration model in Shenzhen Low-carbon City should look like. The two alternatives are first presented and described in this section, followed by a comparison of their respective strengths and potential weaknesses.

#### 9.3.1. Alternative I

One collaboration alternative conceived for Sino-Dutch Shenzhen Low-carbon City is characterized by two-level supervisory and advisory boards, and a Sino-Dutch consortium. The organizational structure of Alternative I is illustrated in Fig.9 below.

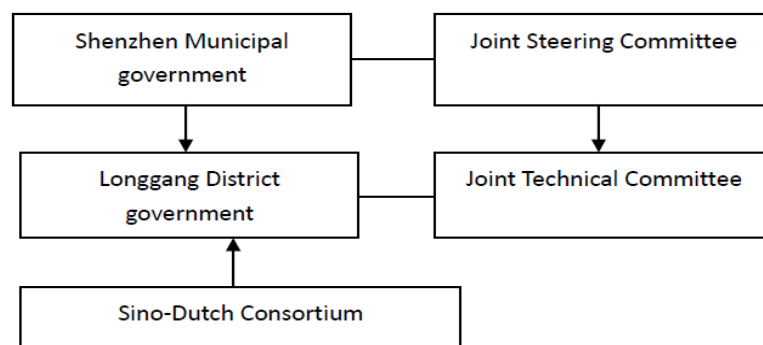


Fig. 10. Organizational structure for Sino-Dutch collaboration alternative I

Set up a Joint Steering Committee consisting of high level officials from Shenzhen Municipal government and Longgang District government on the Chinese side, and Dutch officials from Consul General, Ministry of Economic Affairs, Agriculture& Innovation, and Ministry of Infrastructure & Environment or participating Dutch cities. This committee will meet annually to review the progress of Sino-Dutch Shenzhen Low-carbon City, discuss major issues involved and give policy guidance for the project.

This would be followed by a Joint Technical Committee with Sino-Dutch experts who are independent of private parties. Quarterly meetings may be scheduled for them to look into the content matter in the development of Shenzhen Low-carbon City, help formulate relevant

criteria and parameters, offer evaluative advice to Shenzhen municipal government and Longgang District government. Members in this committee can be experienced researchers, scientists or practitioners.

Arising from the idea of properly package the resources available from Chinese and Dutch companies, a Sino-Dutch consortium can be organized to participate in competitions and tenders made by Longgang District government.

Apart from the major parties shown in the organizational chart, relevant government agencies such as Dutch Consul General in Guangzhou, research and education institutes and other existing platforms can also mobilized to offer assistance in specific cooperation areas.

### 9.3.2. Alternative II

A second collaboration alternative proposed for Sino-Dutch Shenzhen Low-carbon City is characterized by relatively simple governance structure and the foundational agreement between high level government agencies. The organizational structure for alternative II is shown in Fig.10 below.

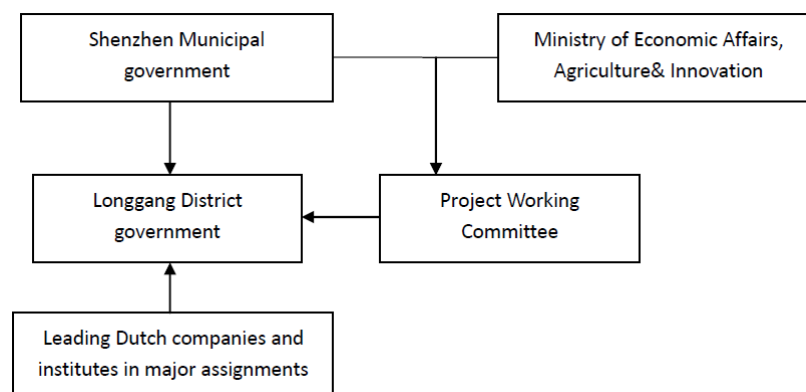


Fig. 11. Organizational structure for Sino-Dutch collaboration alternative II

In this alternative, a cooperation framework agreement can be established between Shenzhen Municipal government and a committed Dutch Ministry (in this case the Ministry of Economic Affairs, Agriculture & Innovation with a higher stake was proposed) on behalf of related Dutch governments. The high-level agreement can lay the foundation for the Sino-Dutch collaboration theme in Shenzhen Low-carbon City and help to secure the involvement of several leading Dutch companies/institutes in some main assignments of the initiative.

Following the agreement, a Project Working Committee can be set up consisting of relevant officials and experts from both sides. They will offer consultations and assistance to Longgang District government, and report project progress and relevant issues to relevant Dutch governments and Shenzhen Municipal government.

Finally several leading Dutch companies under the contract with Longgang District government will spearhead in well-targeted cooperation areas and introduce Dutch elements into key projects. More Dutch companies and institutes may join in the later phase when the project starts taking shape.

### **9.3.3. Relative strengths and weaknesses**

While the two Sino-Dutch collaboration alternatives can satisfy the general requirements of both parties, they vary in the degree of collaboration and extensiveness of participation. Here the analysis on their relative strengths and potential weaknesses is presented as follows.

#### **9.3.3.1. Alternative I**

##### **Strengths**

- Well organized structure with distinct levels of cooperation makes it easier to properly arrange various resources and capabilities.
- Encourage wider participation of government agencies, companies and knowledge institutes from both sides.
- Takes on a stronger identity of bilateral collaboration signified in the two-level supervisory mechanism and mixed Sino-Dutch consortium.
- Extensive partnership with Chinese counterparts promotes mutual learning. Participating parties can accumulate valuable experience from the pilot and apply it elsewhere.
- Facilitates the development of mutual trust and lasting relationship between both sides, which may create more future cooperation opportunities.

##### **Weaknesses**

- Requires much commitment from many involved government agencies.
- Have to align different interests of a network of participating parties on the Dutch side, which takes considerable coordination work.
- Some may become reluctant to accept such collectivity and perceive the arrangement as to a degree risk-sharing

#### **9.3.3.2. Alternative II**

##### **Strengths**

- Simple yet formal structure: mutual commitment represented by Shenzhen Municipal government and Dutch government at the top level.



- Reserve some degree of ambiguity in exchange for flexibility which might be preferred by many.
- Allow a quick start with small scale collaboration among several major participating parties.
- Avoid the possibility of over commitment in front of too much uncertainties.

#### **Weaknesses**

- Requires political support to lay the groundwork by achieving a high-level framework of agreement.
- One particular ministry as the interface has to give much commitment on behalf of Dutch government. Though there will be assistance from other relevant government agencies, it would still require coordination work.
- Limited participation of Dutch companies or institutes. Other interested parties may be excluded or have to wait for more opportunities at appropriate timing.
- Less learning experience with small scale collaboration among limited parties.

Based on the comparison of relative strengths and weaknesses of the two proposed collaboration alternatives, it can be concluded that Alternative I enables more intensive collaboration and wider participation of Chinese and Dutch parties with the requirement of more commitment and coordination. It may also take time to establish such an arrangement. In contrast, Alternative II offers a relatively fast and loosened collaboration approach. With necessary support from Dutch governments, Dutch companies will assume more responsibility of working out the details with Longgang District government. Thus Alternative I will be labeled as the “cultivating” collaboration, and Alternative II as the “sufficing” collaboration.

## 10. Conclusions and reflections

### 10.1. Conclusions

The emergence of eco-cities in China should be understood in a broader urban development and governance context. Here the urban governance interaction model proposed by DiGaetano and Strom can provide the analytical framework for us to understand and explain the complex phenomena and dynamics for the eco-city movement in China.

According to DiGaetano and Strom, a comprehensive and robust investigation of urban governance issues should be approached at three interrelated levels of analyses on the structural context, the political culture, and the political actors (DiGaetano and Strom 2003). The structural context refers to China's transition towards marketization, decentralization and globalization. China's economic reform has induced a series of drastic measures towards marketization, which includes the labor commodification, privatization of production resources, and most relevant here the commodification of built environment by establishing a land and housing market. Under the Chinese law, land is owned either by the state or the collectives. A land user obtains only the land use right with a land grant contract, instead of the land itself or resources below the land. Since 1980s, the land use and development rights become tradable, leading to a land and real estate market based on supply and demand.

During the course of reform, more economic control is handed over to the local governments. Consequently, local governments enjoyed more economic autonomy and fiscal independence (Schröder 2008). Unlike the role of distributor and regulator of resources for western cities, Chinese municipal governments are also responsible for fostering local economic growth and regional development. As both administrative and economic actors, Chinese municipal governments take on an entrepreneurial characteristic. Moreover, with the open door policy, China has developed an export-led industrialization. The attraction of foreign direct investment (FDI) becomes a pivotal element in China's economy. With China's entry into WTO in 2001, the trend of globalization has exerted potent influences across China.

Resulting from the three interrelated factors, changes have incurred in both urban governance structures and urban development strategies. In order to meet the growing demand for urban services brought by continuous urbanization and market speculation, China's entrepreneurial cities actively seek for expansion by turning suburban area into urban use, and compete with each other for FDI and supporting resources from the central government. It is just many of these suburban new towns later turned into new eco-city

projects.

The second level of analysis on political culture would reveal a most distinctive feature of the two-fold party-state structure in China's administrative system. With party branches at all levels of government offices and state-owned enterprises, Chinese policy is termed as "fragmented authoritarianism" by Kenneth Lieberthal (Lieberthal 1995). The top-down yet decentralized system allows quick execution of policies from central government, while keeping enough flexibility and autonomy in local governance. In the case of eco-city development, the unique structure has fostered the increasing emergence of eco-cities in China. The increasing international concern over global climate change has forced China to cut the greenhouse emissions. As a response, in the 11th five-year plan, the Chinese central government set the goal of reducing 20% energy consumption in per unit GDP by 2010 compared to the number in 2005. With the clear target at the national level, local governments were given tough indicators in energy-saving and emissions-cutting (Wu 2012). Facing the challenges brought by continuous urbanization and the requirement of GHG reduction, cities begin to see eco-city as a potential solution to their dilemma and experimental projects were thus initiated. The central government encouraged such efforts and is also attempting to find exemplary projects whose experience can be applied in other cities.

Political actors, at the third level of the analytical framework, correspond to the policy entrepreneurs in terms of eco-city development. In China urban planning usually falls into the responsibilities of administrative authorities. Experts from urban planning bureaus or research institutes are invited to contribute for the review and evaluation, and seldom does the general public participate in the process. Such a situation amplifies the role of some key municipality officials in the urban planning process, which may to a large extent influence the direction of the plan or its acceptability. Within this context, officials who advocate eco-cities as a new development mode of sustainable urbanization can lend their own prestige into the eco-city projects and strive for more resources to make them happen.

The effects from China's structural context, political culture, and political actors together give a potent impetus for eco-cities to spring up across China, all attempting to become a national exemplary eco-city that will revolutionize China's urban development pattern.

Among the many Chinese eco-city initiatives, a number of Sino-foreign collaboration projects are especially eye-catching and have attracted worldwide attention. With a special focus on the most recent Sino-Dutch Shenzhen Low-carbon City initiative, the papers aims to examine previous Sino-foreign eco-city projects and draw on their experience for

recommendations on the collaboration design for Sino-Dutch collaboration in Pingdi Town. In order to better understand the role of bilateral cooperation in Chinese eco-city development, it is essential to first investigate the rationale for international engagement in Chinese eco-cities.

In line with the general findings above, the case studies on existing Sino-foreign eco-city collaborations have provided detailed information to answer the research questions proposed in the study. In the following section conclusions are presented in the same sequence with research questions.

#### **10.1.1. Types of Sino-foreign collaborations in eco-city development**

Based on different features of Sino-foreign eco-city collaboration arrangements across the eight cases under study, three types of Sino-foreign Eco-city collaboration models can be generalized: client-provider/designer type of collaboration, inter-governmental agreement-based collaboration, and JV-based collaboration under joint supervisory board. The explanation and comparison between the three types of Sino-foreign collaborations in eco-city development are shown in Table 3 below.

As is shown in Table.3, the eight Sino-foreign eco-city collaborations can be mapped onto a collaboration continuum ranging from client-provider/designer type of collaboration to consortium based collaboration under joint supervisory board. Here Dongtan Eco-city and Sino-Finnish Mentougou are categorized into the client-provider/designer type of collaboration; Caofeidian International Eco-city, Wuxi Sino-Swedish Low-carbon Eco-city, and Qingdao Sino-German Eco-park are bracketed as inter-governmental agreement-based collaborations; three Sino-Singapore collaboration projects of Suzhou Industrial Park, Sino-Singapore Tianjin Eco-city, and Sino-Singapore Guangzhou Knowledge City represent the highest level of Sino-foreign collaboration in eco-city development. It can be observed that as the collaboration degree increases, more success factors for collaboration can be identified, thus indicating a higher demand for resources and commitment from collaborating parties.

Table. 5 Identified three types of Sino-foreign collaborations in eco-city development

	Type I: Client-provider/designer type of collaboration	Type II: Intergovernmental agreement-based collaboration	Type III: JV-based collaboration under joint supervisory board
Degree of collaboration	<div> <div>Low</div> <div>→</div> <div>High</div> </div>		
Features of collaboration	<p>Transactional agreement;</p> <p>Symbolic support from national leaders;</p> <p>Limited participation of foreign parties</p>	<p>Client-designer/provider collaboration accompanied by political support;</p> <p>Built on established cooperation framework between governments (relational agreement);</p> <p>Package solutions offered by foreign partners;</p> <p>Assistance from promotional government agency or experienced companies</p>	<p>Government-to-government collaboration;</p> <p>Built on established cooperation framework between governments (relational agreement);</p> <p>Consortium-based Joint Venture as master developer;</p> <p>Supervisory board consisting of Joint Steering Committee and Joint Working Committee with control over JV;</p> <p>Government-influenced companies as instrument;</p> <p>Package solutions offered by foreign partners;</p> <p>Wide participation of government agencies, companies and knowledge institutes from both sides</p>
Success factors of collaboration	Resource interdependencies; capacity potential	Economic connections, political support, resource interdependencies, capacity potential, match of expectations, involvement of leaders, promoters	Political relations, economic connections, resource interdependencies, capacity potential, trust, involvement of leaders, promoters, match of expectations, political support, balanced power positions
Initiators	Local government	Local government and national governments	Local government and national governments

Cases	Dongtan Eco-city; Sino-Finnish Mentougou Eco-valley	Caofeidian International Eco-city; Wuxi Sino-Swedish Low-carbon Eco-city; Qingdao Sino-German Eco-park	Suzhou Industrial Park; Sino-Singapore Tianjin Eco-city; Sino-Singapore Guangzhou Knowledge City
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### 10.1.2. Framework of factors influencing bilateral collaborations

Through the case studies on eight Sino-foreign collaborations in eco-city development, different critical success factors can be identified in each case. By synthesizing these success factors derived from all the cases, a framework of relevant factors influencing Sino-foreign collaborations in eco-city development can be formulated. These factors are systematically organized into three categories: political-institutional factors, organizational factors, and individual factors. The proposed framework of factors influencing Sino-foreign eco-city collaboration is illustrated in Fig. 9. Each identified factor is presented and explained in detail as follows.

#### 10.1.2.1. Political-institutional factors

##### Economic connections

The financial viability as an important aspect of eco-cities/ industrial parks brings in the economic context into the study. In many eco-city/ industrial park projects, foreign direct investment is an important source of competitive advantages in regional development. The partner countries contribute different resources to the collaboration primarily through their government agencies and companies, and a history of close economic connections makes it easier to align the economic interests and bring these companies together in the collaboration. Additionally, since urban planning and development involves the pursuit of strategic goals in the long term, it becomes easily understandable that a benign political and economic relation can contribute to the stability of the collaboration from a long-run perspective.

##### Political relation

Given the theme of Sino-foreign collaborations in eco-city development, such bilateral co-operations are somewhat inevitably affected by the overall political relations between the two countries if the projects want to gain more recognition. Though not all the cases are positioned as government-to-government collaborations, the political support they received is

to a degree dependent on the existing bilateral political relations. It can be observed from the cases that the idea of joint development of eco-city/industrial-park often originates from some key official's state visits. Even in some entrepreneurial cities' eco-city initiatives, their efforts of elevating the project to a national level at a later stage will also invoke the political support and diplomatic contacts between the two sides. The political relation will therefore play a role in creating intergovernmental dialogue opportunities and further affect the shape-up of bilateral collaborations.

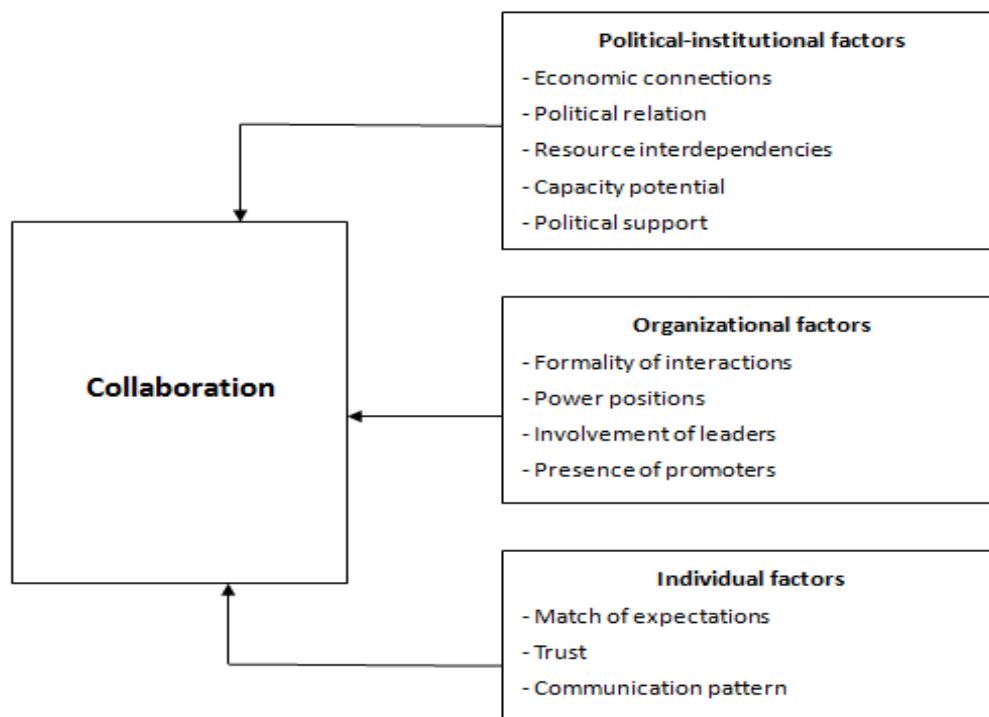


Fig. 12 Framework of factors influencing Sino-foreign eco-city collaborations

### Resource interdependencies

In line with the definition of collaboration, the mutual needs that underlying the cooperation stems from the resources interdependence between parties. As is pointed out by Mulford and Rogers, increased interdependencies result in greater need for intra- and inter-organizational collaborations(Mulford and Rogers 1982).Gray also describes collaboration as a “logical and necessary response to turbulent conditions”(Gray 1989).In eco-city projects, the resources can be identified as the required knowledge, skills and capacity that go beyond political boundaries and spheres of responsibility. Resource interdependencies can be measured by mapping out what each party brings to the collaboration and what they want in

turn from others.

### **Capacity potential**

Parties enter into a certain collaboration are motivated by the increase of capacity by joining hands. As can be observed from the Sino-foreign eco-city cases under study, entrepreneurial cities alone do not have sufficient knowledge and expertise required in such initiatives, therefore reaching out for assistance from other parties. Noticeably, by partnering with other parties, they can not only have access to complementary resources, but also be able to enhance their own capacity in many intangible ways. Gough discussed that cooperating parties can benefit from the social (interpersonal relationships and trust), intellectual (understanding of others' interests and negotiated knowledge), and political capital (stakeholder's combined ability to influence decision making) from collaborations (Gough 2008). The space of capacity potential therefore, can affect the parties' commitment and efforts into the collaboration.

### **Political support**

Endorsement and commitment from high level officials is indispensable in bringing about a long-duration of development project like eco-city/knowledge city. Perhaps this is especially the case in China where an authoritarian political system dominates. Gray argues that external support from the political arena has a crucial role in enacting collaborative decisions (Gray 1989). Another important aspect relates to the legitimacy brought by collaborations that helps to justify individual party's behavior. With increased legitimacy, institutions can benefit from improved image, reputation and proven norms as is stated in institutional theory (DiMaggio and Powell 1983). Moreover, key officials can lend their personal prestige into the projects and mobilize various actors and resources for the collaboration.

## **10.1.2.2. Organizational factors**

### **Formality of interaction**

To a large degree the formality of interaction between cooperating parties signifies the importance they attach to the collaboration. It assures cooperating parties of partner's confidence and commitment in the collaboration, as well as standardizes the operations. Formality can be shown in many forms, including the regularity of interactions, the concrete institutional arrangements facilitating bilateral communication, negotiated rules and agreements in writing.

### **Power positions**



Power positions in negotiations and collaborations usually have subtle yet important implications for cooperating parties. Knowledge, resources and legal authority are the sources of such power positions. Those having an upper hand in power positions may take advantage of the other party and force them into compliance. In turn, parties with inferior power position may be reluctant to cooperate when they feel their interests have been compromised. More balanced power positions of parties may increase the stability of collaboration and prevent one-sided dominance.

#### **Involvement of leaders**

While trust and commitment can sustain the collaborative relationships between the parties, effective leadership is the catalyst that adds momentum to the efforts and manages the interactions towards desirable directions. Chrislip wrote in his book on collaborative leadership that collaboration needs leaders “who can safeguard the process, facilitate interaction and potentially deal with high levels of frustration”(Chrislip 2002). Although leaders in these collaborative arrangements may have little formal control, it is important that they are involved in the process and have regular contact with key actors. Their visionary thinking and mobilizing skills are crucial inputs to guarantee the success of the collaboration.

#### **Presence of promoters**

Since leaders usually do not have hands-on control over collaborations and are often occupied with different priorities, the responsibility of keeping the collaborative network and facilitating flows of information falls to the project promoters. Agranoff described these promoters as visionary keepers who support leaders with essential information, expertise and organizing energy(Agranoff and McGuire 2003). Gough argues that promoters also have role of legitimizing partnership with persuasion and influence, and thus bringing more players into participation(Gough 2008).

### **10.1.2.3. Individual factors**

#### **Match of expectations**

As is defined by Gray, collaboration happens when parties see different aspects of a problem and use their different resources to explore suitable solutions. Indeed perceptions from different aspects of a problem triggered the possibility of collaboration. However, the viability of such collaboration depends on the match of expectations from participating parties. While the individual interests of involved parties should be respected, it is the shared goals that give rationale for their collaborations and bind them together. Mutual need or interest lay the foundation of collaboration, while different areas of competency create the possibility of

reciprocity during the collaboration. The match of expectations just refers to such reciprocity and mutual needs perceived by the parties.

### **Trust**

Large scale eco-city projects with long time span involve substantial uncertainties during the course of development. In order to counteract various uncertainties lying ahead, collaborating parties need more than formal rules. Trust here serves as the help against the uncertain conditions and changing circumstances. Trust is defined as the expectation of the good intentions of other actors. According to Koppenjan and Klijn, trust includes stable perception about the other party and the expectation that the other party will abstain from opportunistic behavior should an opportunity emerge in the future. They further concluded that the advantages brought by trust in cooperation include reduction in transaction costs, improvement of investments and stability in relations. With the belief in good intentions of others, trusting parties accept the vulnerability to potential uncertainties and commit themselves in the collaboration.

### **Communication pattern**

It is important that there are both horizontal and vertical communication channels among the participating parties. It is not only based on the organizational arrangement, but more importantly in the communication pattern of all those involved in the collaboration. Open and direct communication enables the development of trust, while overreliance on vertical communication pattern may incur frictions and mistrust that undermine the collaboration, as is observed in the case of Suzhou Industrial Park.

### **10.1.3. Proposed collaboration alternatives for Sino-Dutch collaboration**

Two Sino-Dutch collaboration alternatives for Shenzhen International Low-carbon Town are summarized in Table. 4 below.

Table. 6. Proposed collaboration alternatives for Sino-Dutch Shenzhen Low-carbon City

	<b>Alternative I: Cultivating collaboration</b>	<b>Alternative II: Sufficing collaboration</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Joint Steering Committee consisting of high level officials from Shenzhen Municipal government and Longgang District government, and Dutch officials from Consul General, Ministry of Economic Affairs, Agriculture &amp; Innovation, and Ministry of Infrastructure &amp; Environment and participating Dutch cities</li> <li>• Joint Technical Committee with Sino-Dutch experienced researchers, scientists or practitioners independent of private parties</li> <li>• Sino-Dutch consortium can be organized to participate in competitions and tenders</li> </ul>	<ul style="list-style-type: none"> <li>• Cooperation framework agreement established between Shenzhen Municipal government and a committed Dutch Ministry</li> <li>• Project Working Committee consisting of relevant officials and experts from both sides.</li> <li>• Several leading Dutch companies under the contract with Longgang District government spearhead in well-targeted cooperation areas and introduce Dutch elements into key projects</li> </ul>

<b>Strengths</b>	<ul style="list-style-type: none"> <li>• Well organized structure with distinct levels of cooperation facilitating proper arrangement of various resources and capabilities.</li> <li>• Encourage wider participation of government agencies, companies and knowledge institutes from both sides.</li> <li>• Takes on a stronger identity of bilateral collaboration signified in the two-level supervisory mechanism and mixed Sino-Dutch consortium.</li> <li>• Extensive partnership with Chinese counterparts promotes mutual learning. Participating parties can accumulate valuable experience from the pilot and apply it elsewhere.</li> <li>• Facilitates the development of mutual trust and lasting relationship between both sides, which may create more future cooperation opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>• Simple yet formal structure: mutual commitment represented by Shenzhen Municipal government and Dutch government at the top level.</li> <li>• Reserve some degree of ambiguity in exchange for flexibility which might be preferred by many.</li> <li>• Allow a quick start with small scale collaboration among several major participating parties.</li> <li>• Avoid the possibility of over commitment.</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>• Requires much commitment from many involved government agencies.</li> <li>• Have to align different interests of a network of participating parties on the Dutch side, which takes considerable coordination work.</li> <li>• Some may become reluctant to accept such collectivity and perceive the arrangement as to a degree risk-sharing</li> </ul>	<ul style="list-style-type: none"> <li>• Requires political support to lay the groundwork by achieving a high-level framework of agreement.</li> <li>• One particular ministry as the interface has to give much commitment on behalf of Dutch government. Though there will be assistance from other relevant government agencies, it would still require coordination work.</li> <li>• Limited participation of Dutch companies or institutes. Other interested parties may be excluded or have to wait for more</li> </ul>

		<p>opportunities at appropriate timing.</p> <ul style="list-style-type: none"><li>• Less learning experience with small scale collaboration among limited parties.</li></ul>
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#### **10.1.4. The role of bilateral collaboration in Chinese eco-city development**

The development of eco-cities poses high demands on technical, administrative and financial resources that are usually beyond the capacity of entrepreneurial cities. Since sustainability issues are inherently complex and uncertain, the development of an eco-city often requires shared knowledge and co-ordination that are beyond existing political boundaries and spheres of responsibility (Joss 2011). Consequently, local governments reach out to gather resources and support for their eco-city projects. The first thing they need is a sound feasibility study and a master plan with innovative visions. That's usually where the foreign partner's expertise came into help. Prominent foreign urban design and architecture firms have more experience in sustainable urban planning and can contribute to an integrated and innovative master plan that kick-starts an eco-city project. Moreover, the technological solutions for an eco-city are also the external resources local governments need to reach out for. Thus, collaboration with foreign partners gives entrepreneurial cities access to advanced technical resources.

Except for the tangible resources, collaborations with foreign partners may also attract more attention from both sides and garner more political support from central government. Currently many Chinese cities are launching eco-city projects which wait on a list for national recognition and support. Chinese national government encourages the exploration for sustainable urban development at local level and wants to draw on experience from successful practice which could be further applied in a national scale. However, not all eco-city projects can receive preferential policies and national level support. In order to stand out from competing project, cities endeavor to forge collaborations with foreign partners, impress the central government with their visionary and ambitious plans, and elevate the project to a higher level through joint efforts on both sides. In addition, the opportunity of being recognized as an exemplary eco-city can also strengthen the local decision-making capacity, since more foreign expertise can be brought to bear on urban development problems and challenges that multiple government units share in common.

Moreover, as international elements are increasingly becoming a valued competitive advantage, the distinct features of Sino-foreign eco-cities or low-carbon cities embodied a differentiation strategy of these so called entrepreneurial cities. The eye-catching and sometimes exotic designs by foreign parties distinguish these eco-cities from other cities and help them to gain a stronger local identity. It is also expected that a Sino-foreign eco-city will make international companies feel more familiar and comfortable, thus more easily attracting FDI into the city. Additionally, when partnering with foreign parties, many Chinese entrepreneurial cities based their choice on the local economic connections with a particular country. Such a deliberate choice may imply a more pragmatic and targeted strategy which aims to strengthen the cities' existing advantageous economic relations with a certain foreign country and expanding their collaboration areas into knowledge and technology transfers.

The collaboration with foreign parties also helps to find financing channels for the eco-city projects. In these initiatives usually a municipality owned urban development investment

corporation (UDIC) is set up to raise loans from commercial banks. A competent and visionary master plan by prominent foreign companies or institutes can convince the banks and secure the infrastructure investment loans. Besides, since most Chinese eco-city projects are based on the real estate development, foreign partners may see the profit potential in China's buoyant real estate market and become investors of the eco-city development projects.

### **Shared critical factors**

Based on the case studies, it can be observed that there are some factors playing a dominant role across different cases. In the following part the summary of shared critical factors are presented, followed by a discussion of the potential justifications.

Many of the Sino-foreign collaborations under study were influenced by economic connections. The two factors of economic connections and political relations either directly bring about the collaboration project, or played a supportive role when entrepreneurial cities seek out for financial resources and political support in a later phase. The economic connections at national level and local level all have significant indications for the particular collaboration project. In the case of Suzhou Industrial Park, Sino-Singapore Tianjin Eco-city and Qingdao Sino-German Eco-park, strategic vision by both national governments led to the collaboration projects. In comparison, Sino-Singapore Guangzhou Knowledge City and Wuxi Sino-Swedish Low-carbon Eco-city are initiated by local governments and received the recognition and support from national governments in the second round. The significant impact of economic connections and political relations can also be readily understood given the international cooperation theme in these projects. Stable political relations and close economic connections together can provide a favorable climate for collaborating parties on both sides.

Match of expectations and resource interdependencies are another pair of important factors identified in these cases. As is analyzed in the conceptual framework part, the concept of eco-city was proposed years ago. Over the years it evolved and was gradually seen as a potential solution to the dilemma of environmental degradation and continued urbanization. Collaborating parties enter into eco-city initiatives with different underlying wishes and goals, how did their expectations converge at the eco-city development project is particularly important not only in terms of the success of their collaboration, but also for the achievement of eco targets. It is just the wishes and resources of participating parties that formed the dynamics behind their cooperation, and further shaped the collaborative organizational arrangements. For example, in the case of Sino-Singapore Guangzhou Knowledge City, the primary goal is to upgrade the industrial structure and shift towards knowledge-based economy. It is especially intriguing to see that in this kind of city re-development not directly motivated by environmental concerns, eco-city is still proposed as part of a package solution to realize its economic restructuring goals. To be a unique, vibrant and sustainable city, Guangzhou Knowledge City chooses to embrace the trend of eco-cities that can improve quality of life and boost the growth of a green economy(SSGKC 2012).

It is also interesting to notice that formality, involvement of leaders and promoters also

have an on the bilateral collaborations under study. It may be inferred that formal collaborating platforms and promoters are established with the endorsement of high-ranking leaders on both sides. No matter whether the national governments have played an active role in bringing about the collaboration, it is only with their support that the project can be elevated to a higher level and draw on a broader scale of resources. Even the symbolic presence of top leaders can make a difference and set the tone for the collaboration. It can be argued that the top leaders' presence and attention can influence the collaborating parties' perception about the project. In the case of Dongtan, originally it was a client-designer contract relationship between Arup and Shanghai Industrial Investment Corporation (SIIC). With the acclaim of national leaders, it was turned into an exemplary cooperation with high ambitions towards eco-city development. Although in the case of Dongtan the conditions were not mature enough to launch a world-class eco-city, the project still managed to leave a strong impression to the world as a high-profile eco-city initiative and raise the awareness of eco-city concept among many government officials, urban planners and citizens. Similarly, in the case of Sino-Finnish Mentougou Eco-valley, although there was no formal involvement of Finnish government, they lent their support indirectly through Finnish Environmental Cluster for China and the attendance of president. A formal collaboration structure is also conducive to a wider participation of companies and thus likely to cultivate more future cooperation opportunities with local partners.

## 10.2. Reflections

The study was prompted by the Sino-Dutch Low-carbon City project and aims to explore what a suitable bilateral collaboration would look like within the specific context and conditions on both sides in this case. To do so, it is necessary to look into past Sino-foreign eco-city practices in China, find out what their experiences are and how did these collaborations work out. Although the idea was pretty clear in the beginning, problems and unexpected difficulties still surfaced during the study.

First eco-city is a rather loosely defined concept. There is no universal consensus about what exactly should be encompassed in an eco-city, and eco-city development is still rather immature across the world. There are ambitious initiatives providing exemplary practices, however, distinct conditions in different countries, regions and cities make direct transplantation of others' experience almost impossible. The eight Sino-foreign eco-cities under study have different physical conditions and varying goals. In the subject matter of bilateral collaboration, different approaches and organizational structures were adopted in these initiatives. Since most of the Sino-foreign eco-cities are still in the beginning phase, there are no systematic record on these projects. Therefore, in this study an inventory of Sino-foreign eco-city projects has to be established first. Desk research on relevant information was quite time-consuming and sometimes frustrating. Some relatively low-profile eco-cities even do not have official websites or detailed documentary. In these cases, scattered information was collected from pieces of newspaper articles and collaborating parties' website. The limited availability of public information on the details was one major difficulty the research



encountered. In addition, traditionally most Chinese governments are reluctant to reveal details about such international collaboration projects, especially when these initiatives are still taking shape and surrounded by a lot of uncertainties. This makes it difficult to figure out the potential conflicts and problems in collaborations. News coverage also tends to give positive reports and depict a promising future ahead. Nonetheless, there are projects like Suzhou Industrial Park and Dongtan which are well documented with many studies from different perspectives. Thus the two case studies have rich content, which enables in-depth analysis and reflections. In contrast, other ongoing projects are still in the early phase. Consequently it is difficult to judge if they are successful collaborations even in their own perceptions. All these differences together posed a challenge for the study to find a framework that would be suitable for case studies across these projects. Considerable time was spent on structuring the cases and figuring out what are the elements that the study needs to get out of them. And that was quite a strenuous experience.

Except for the heavy work in empirical information collection, the formulation of theoretical framework in this study was also an exploration. In the beginning in order to maximize the utility of case studies, an “everything could be interesting” approach (which is also the reason for using case study as the research method) was used in information collection in hope of getting better ideas on suitable theories through case studies. However, when the compilation of eight cases was done, many interesting perspectives surfaced in different cases but seldom can they be applied to all the cases. So the scope was narrowed down to the bilateral collaboration arrangement which is also the theme of the research. Initially a cross-case comparison was tried but was to a degree farfetched due to the differences in information availability and degree of collaboration. With the guidance of my supervisors, the institutional theory and especially Richard Rose’s work on lesson drawing was introduced in the study. It provided an evaluative framework and enables lesson drawings for the Sino-Dutch collaboration in Shenzhen International Low-carbon Town from different cases. It directly serves the objective of the research and circumvents potential pitfalls in cross-case comparison, which turned out to be too general and not case specific.

Moreover, there is a gap in literature about bilateral collaborations in eco-city development. Much related research was under the topic of collaboration governance and collective project management, which cannot be exactly applied in this study. Some of the Sino-foreign bilateral collaborations are based more on client-provider relationship, although they are usually accompanied by political support. Thus the additional dimensions of political factors also made them unique and beyond the scope of existing studies. As a result, the main research question was later changed into “what’s the role of bilateral collaborations in Chinese eco-cities” with the attempt to fill in the gap through the case studies in this research.

Due to the variety of different dimensions of eco-cities, observations can only be made at a general level with a more specific purpose of lesson drawings for Sino-Dutch collaboration in Shenzhen International Low-carbon Town. One limitation of this study was a lack of primary data through interviews to collect valuable information such as collaborating parties’ perceptions on their bilateral collaborations. Future studies on this topic may focus on

different types of collaborations and apply categorically suitable theories in the study of each type, so that systematical conclusions can be drawn as to what specific benefits and challenges would be in each collaboration type, and on what conditions a certain bilateral collaboration type should be adopted. Furthermore, studies can be made to look deeper into the cases through interviews. As each of the eco-city initiative represents a large scale project, in-depth analysis will require considerable primary data through probing questions. Based on the empirical information collected in this study, more case specific questions can be formulated to . Finally, international bilateral collaboration experience in other countries may also provide some valuable insights for further study on the topic. Their innovative ideas can throw light on the exploration for bilateral collaborations in eco-city development on a global scale. In this way the institutional transplantation will go beyond the lesson drawings from Sino-foreign eco-cities to a fully international level.

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## 12. Appendices

### Appendix A. List of Sino-foreign eco-cities/low-carbon cities

Case	Year
Dongtan Eco-city (Shanghai City)	2005
Sino-Singapore Tianjin Eco-city (Tianjin City)	2007
Caofeidian International Eco-city (Tangshan City)	2008
Wuxi Sino-Swedish Low-carbon eco-city (Jiangsu Province)	2010
Sino-Finnish Mentougou Eco-valley (Beijing City)	2010
Sino-Finnish DigiEcoCity in Gongqing City (Jiangxi Province)	2010
Qingdao Sino-German Eco-park	2010
Sino-Finnish DigiEcoCity in Danyang City (Jiangsu Province)	2011
Sino-Dutch Low-carbon Eco-city in Pingdi (Shenzhen City)	2011
Zhangjiagang Sino-Danish Eco-city Park	2012

## **Appendix B. General findings from the case studies**

From the case studies on eight Sino-foreign eco-cities, a number of general findings have been observed across the cases. Though they do not directly answer the research questions formulated in this paper, they can serve as the foundation for future research work on the topic of bilateral collaborations in Chinese eco-city development and are therefore included in the appendix of this paper.

### **Public-private partnership**

Eco-city initiatives pose enormous requirements on resources and capacities and hence necessitate multiple levels of cooperation between a network of entities including government authorities at local, regional and national levels, as well as many native and foreign companies with expertise in different fields. In most of the eco-city projects under study, public-private partnerships were adopted by governments working collaboratively with companies engaged in real estate development, architecture design, technological solutions, financial services, consulting services, etc. Differences in the balance between public and private sectors have been observed across the cases. Caofeidian International Eco-city, Wuxi Sino-Swedish Low-carbon Eco-city and Sino-Finnish Mentougou Eco-valley are mainly local government initiatives. In these cases, governments assumed the primary responsibility for providing much or all of the financing, making selections on cooperating parties to be involved, and project administration. These cities take on strong characteristics of the so called entrepreneurial cities that autonomously initiate and organize these projects. Suzhou Industrial Park and Sino-Singapore Tianjin Eco-city have joint ventures between Chinese and Singaporean consortia as the master developers. Chinese and Singaporean private-sector companies joined the collaboration and were present in these consortia; however, as these consortia were led by state-owned enterprises, the state or local governments still had considerable influence over the JVs. Sino-Guangzhou Knowledge City is an even more extreme case with a JV between two investment companies wholly owned by governments on each side respectively. In contrast, Qingdao Sino-German Eco-park used a mixed model with an investment company owned by Qingdao government on the Chinese side, and private companies supported by Federal Ministry of Economics and Technology spearhead on the German side.

Different models in eco-city projects are faced with different challenges. A paper by Asanga Gunawansa argues that a traditional public-private-partnership (PPP) model of project development may not be an appropriate vehicle for developing eco-city development (Gunawansa 2010). It's difficult to bind developers and end-users to the government regulations and standards for sustainability. There may be reluctance for developers to take on the responsibility of administering corresponding rules or regulations. On top of that, as a major group of stakeholders, the end-users' acceptance and compliance will also play a decisive role in the viability of the eco-city. Government-driven projects are potentially vulnerable to these challenges. The complexity of a network of public and private

players may raise problems like mismatch of expectations, disparity of hierarchical structures, and mistrust between collaborating parties. The case study on SIP and the problems surfaced during its development course is just a case in point. Due to a heavy reliance on government influences, the JVs in Sino-Singapore Tianjin Eco-city and Sino-Singapore Guangzhou Knowledge city also have to deal with the intricate coordination and communication issues while striving to maintain the image of a collective entity.

Eco-city projects driven by private sector on the other hand have to answer for another set of difficulties. The coordination among a network of private companies become problematic when there is no established institutional authority with a government agency in the center. More importantly, without the government's backup, it's extremely difficult to gather enough financial support for large-scale and high-standard projects like eco-cities. Private companies usually can't afford the long term investment in eco-city initiatives. The stake transfer on the Singapore side may be another example of the conflict between the long duration of eco-city or knowledge city development and the need for a quick return on investment for private parties. It is just the insufficiency of traditional public-private-partnership (PPP) model in eco-city or knowledge city development that prompts continuous explorations for suitable collaboration mode within a specific context. Doubtlessly private sector can bring enormous financial and technological resources that are essential for new city development; however, the question remains as to how to address such conflicts and balance the public interests while maintaining the financial viability of the project. In the case of Guangzhou Knowledge City, Temasek Holdings Pte., Ltd wholly owned by the Singapore government and Guangzhou Knowledge City Investment and Development Co., Ltd wholly owned by Guangdong Development District formed the JV. This may as well again emphasize the indispensable roles of governments in eco-city or knowledge city development. Still institutional innovation can be observed in the "enterprise-led, government-driven and market operated" cooperation mode.

### **Seek for political support**

It can be seen that in all cases under study, collaborating parties actively seek political support on both sides. This observation leads to the question of what's the implication of political support in Chinese eco-city initiatives.

Here we examine the role China's national government plays in eco-city projects. Using a theoretical perspective, urban development is always associated with the spillover effects. Merely the benefits at the local level cannot be sufficient to justify the extra efforts and resources to be committed in eco-city development. One of the national government's functions as the regulator of activities that generate externalities can be applied here to have a fundamental insight into the role of national government plays in eco-city projects (Mueller 2003). Admittedly, environmental problems such as GHG emissions, water and air pollution, and energy security have transcended both geographical and jurisdictional boundaries. They cause more national and international concerns rather than local struggles. Based on this rationale, central government must provide supplementary momentum to its entrepreneurial



cities' endeavors toward pioneering eco-cities in the world. For local governments, the support from central governments means recognition and possible preferential policies. These rewards, either moral or financial, can be an effective tool to realign the interests and offer the incentives for the local governments.

The scattering eco-city initiatives in different regions of China with an experimental nature also call for the monitoring, supervision and evaluation system of the central government. Based on the system, the central government can have a general picture of the performances of different projects, and provide rewards when necessary. More importantly, through such monitoring and contrastive comparison, the central government can learn from the ongoing eco-city practice and extract the successful experience into general guidelines which are valuable for future practices. It presents an opportunity for the national government to assume a stronger role in the eco-city planning process that is compatible with the currently urban planning process.

Besides, it is also in the foreign partner's interest to gain the commitment and support from the national government. As is mentioned earlier, the preferential policies will create favorable conditions for the project and promote its development from the early beginning. One being selected as an exemplary project, the eco-city will draw more media attention, and consequently give them more publicity which can help to establish themselves in the venturing market. Still, a more fundamental implication of central government's support lies in the conflict between the short-term political representation at the local government level and the long-term public interest involved in eco-city development. Evidently key political actors in the entrepreneurial city can have quite an impact on eco-city project; however Chinese officials usually have only a limited tenure for positions at the municipality level, and later get transferred to other places or promoted to higher positions in central government. This means former and incumbent local government officials at the same position may prioritize the project differently, which may affect the progress of its development and may deviate from the original plan. The support and commitment of the national government, however, will help to ensure the long-term interests of the local residents will be appropriately considered and included during the process consistently, thus abating potential negative impact brought by short-term political representation and dependency on local political advocator.

At the local level, some key government officials act as the policy entrepreneurs who advocate eco-cities as a new pattern of sustainable urbanization. They actively look for external resources and are increasingly including international partners in the eco-city development. The innovative master plan, together with the package of technological solutions and management software give them a competitive edge in the competition with other cities for the recognition and support from national government. Moreover, the international element in eco-cities can also help to attract foreign direct investment, which is an important factor in Chinese cities' economy. Local governments with both administrative and financial autonomy are usually the initiator, organizer and developer of eco-city projects.

For foreign partners, support from their national governments usually provides them with a more stable cooperation platform. Even symbolic involvement of government leaders could influence the perception of their cooperating partners and impress them with the attention from high-level officials. The presence of high-ranking leaders can also possibly elevate the project to a new level, encouraging collaboration parties to get more quality out of the project. Additionally, a regular dialogue channel to local government agencies and private companies provided by government entities is also favorable for exploring and capitalizing on future cooperation opportunities for these foreign companies.

### **Reliance on real estate development**

The business model in Sino-foreign eco-city projects are either explicitly or implicitly based on real estate development. Usually the established joint venture as the master developer will derive revenue from land sales and property development. After acquiring the land at relatively low prices set by the state based on agricultural revenues and resettlement costs, JV improve the land with infrastructure as pre-agreed on, and then sell some serviced land to developers for property development. The infrastructure costs by the JV will be recouped through amenity fees. In some cases like Dongtan and Caofeidian, the project is entirely owned by the investment company of the local government. In such situations, foreign companies first enter the master-planning phase as the designer offering design and consulting services, and later more international companies in clean technologies join as investors focusing on different areas of technology collaborations.

However, the heavy reliance on real estate development across all the cases under study raises the question of how to balance the commercial and public interests. The pressure from private sectors may cause conflicts with the achievement of eco-goals. In some cases efforts have been made by listing concrete proportion of affordable housing in the indicators. Still the fundamental solutions are still to be explored in the rigorous assessment of the existing laws, contractual arrangements and administrative practices.

### **Focus on technology**

Most of the eco-city projects under study set clear goals in the adoption of environmental technology. However, the emphasis on application of green technologies varies across cases. In the extreme case of Dongtan, although high ambitions were expressed to build an innovative eco-city, no environmental technology firms were involved to draw up the technological solutions in the implementation plan. In Sino-Singapore Tianjin Eco-city, Caofeidian International Eco-city, Wuxi Sino-Swedish Low-carbon Eco-city and Sino-Finnish Mentougou Eco-valley, technology companies are engaged in the projects to support the vision set in world-class master plan. However, innovative technological solutions are not the direct driver of these projects. It is the housing demand or eco-restoration goals that bring about these new city development projects; the need for sustainable urban planning services plays a dominating role in prompting the collaborations. In these cases, technological solutions provided by companies in different fields of expertise are included as part of the package deal for the client in their pursuit of building a new sustainable city. In contrast, innovative environmental

technology adoption is the central topic of Qingdao Sino-German Eco-park. For the German government and companies, the main goal in the collaboration of Qingdao eco-park is to showcase their advanced environmental technologies and gain a larger share of the green technology suppliers in the Chinese market. The fact that the focus on green technologies is usually part of the package solutions accompanied by urban planning services in Chinese eco-city initiatives may again emphasize the importance of inclusion of actors and interdisciplinary cooperation in eco-city initiatives. It also offers a possible strategy for countries interested in entering the green industry in the Chinese market: environmental companies should build strategic alliance with urban design and architecture firms and altogether provide a package solution including both master plan and detailed implementation plan to their client - the entrepreneurial cities. In the cases of Sino-Singapore Tianjin Eco-city, Sino-Singapore Guangzhou Knowledge City and Wuxi Sino-Swedish Low-carbon Eco-city, it is the government who had identified such a need and played an active role in gathering urban design, architecture and technology firms together to improve the “client experience” on the Chinese side and strengthen the collaboration.

### **Emphasis on research and education**

From the case studies it can be observed that all the eco-cities have education/research institutes as part of its development plan. This commonality in eco-city practice prompts the analysis into what are the benefits of including education/research institute development in eco-city initiatives. Firstly, the presence of an education/research institute in the eco-city can create job opportunities associated with teaching, research and providing services for the institute. In this way, it can also help to promote employment across social and economic demographics in the region. This is especially important for new cities which need to create employment opportunities and promote GDP growth in a relatively short period.

With an education/research institute in place, it will also be easier for the eco-city under development to build connections with other knowledge institutes and tap into their experience and resources. As part of the localization strategy, foreign partners need more intensive local contacts and contextual knowledge within the particular city. An education and research institute may provide such a communication channel in the early phase and help foreign partners to draw on broader support from local institutes having a stronghold there.

More importantly, the talent pool developed by the institute with a theme in sustainability will in turn attract companies to the eco-city, especially those with an interest in environmental technologies. Ideally, a well-developed education-research institute will also encourage thriving spin-off businesses around it, which would highly promote the high-tech industries near the eco-city. Thus a Harvard-like model will foster continuous innovation of technological solutions in the region through spill-over effects, which in turn serve as the knowledge and technology input to the eco-city development.

Furthermore, since education has always been a central theme in national development, having an education/research institute in the development plan may also help the eco-city to gain a favorable position in interactions with the central government and hopefully receive

more government incentives and assistance. An education/research institute can be an auxiliary tool to influence the mindset of local residents and raising more environmental awareness. Thus sustainable lifestyles will be propagated across the public with a younger generation of students as the spearhead.

However, the development of a successful education/research institute may take years, and hence can't serve as a catalyst for the eco-city at the beginning phase. Building a new institute from scratch takes a lot of time and resources, not to mention the success of the institute also relies on many given factors that are hard to change (e.g. the location of the eco-city and the employment opportunities there, or the existence of high-quality universities in nearby area). Not every city owns the necessary resources to be a research city focusing on development of new technologies for other cities. The Harvard-like model as envisioned in Dongtan is ambitious, yet risky in the sense that the success of the commercial strategy largely depends on the success of the institute. The idea of introducing education/research base of prominent universities may be a more practical way to go as in the case of Caofeidian Eco-city and Guangzhou Knowledge City. With explicit and specific goals in training or research, they have clearer and more attainable targets in the short-term while still reserving the potential to expand when needed.