



**Delft University of Technology**



***Responsible Innovation of Chinese ports: Evaluation  
of Shenzhen Yantian Port Extension Project***

# Title Page

**Title** Responsible Innovation of Chinese ports: Evaluation of Shenzhen Yantian Port Extension Project

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## Acknowledgment

This is my master thesis of Engineering and Policy Analysis in the Faculty of Technology, Policy & Management of Delft University of Technology.

*"New York is 3 hours ahead of California, but it does not make California slow;  
Someone graduated at the age of 22, but waited 5 years before securing a good job;  
Someone became a CEO at 25, but died at 50;  
While another became a CEO at 50, and lived up 90 years;  
Someone is still single, and someone else got married;  
Obama retires at 55, but Trump starts at 70;  
Absolutely everyone in this world works based on their time zone;  
People around you might seem to go ahead of you, some might seem to be behind you;  
But everyone is running their own race, in their own time;  
Do not envy them or mock them, they are in their time zone and you are in yours;  
Life is about waiting for the right moment to act;  
So relax! You are not late, you are not early;  
You are very much on time, and in your Time zone destiny set up for you."  
--You never fall behind in your own time zone*

This is a poem I love from the bottom of my heart and I also believe it describes my journey which I have overcome many hardships and finally lived my words and accomplished my thesis. It is a very challenging task for me to accomplish this master thesis. I finished all my courses at 2018, and then worked in a financial institution. Making research while working is a great challenge. "Giving up" these two words flashed through my mind for many times. However, I still believe I am running my own race in my own time zone. I do not compare my thesis with others and just focus on what I am doing. Therefore, I am delighted that I make it finally.

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Wei Dai  
Oct 2021, Shenzhen

## Executive Summary

Traditional Chinese ports are still under the influence of the "Economy centralized principle", economic interests are amplified while environmental and social impacts are seriously ignored. In this way, disharmony appeared and severely interrupted the execution of the projects. Therefore, an approach which could bridge the environmental and social conflicts is urgently needed. Responsible innovation is such an approach.

Under the responsible innovation framework, the essence of conflicts lies in stakeholder's value conflicts. Therefore, research questions are proposed:

- *Have Chinese ports seriously considered the value conflicts with other stakeholders and realized Responsible Innovation?*
- *How can Chinese ports from their best efforts bridge the value gaps, realize Responsible Innovation?*

In this study, Shenzhen Yantian port extension project is introduced as the case to study as Shenzhen is the most open city since China's "Open up and Reform". In addition, in responsible innovation analytical framework, determine the stakeholders involved, the impacts brought by the project and value conflicts among stakeholders are important steps in terms of detecting the essential value conflicts and find a possible solution to bridge the value gaps. As a result, three analyses are made for the purpose of determining the value conflicts between Chinese ports and other stakeholders, they are stakeholder analysis, impact assessment and value conflict analysis.

From three analyses, this study concludes that Shenzhen Yantian port did not completely take: "all the stakeholders involved", "impacts brought by the project" and "value conflicts between them and other stakeholders" into account. In other words, Shenzhen Yantian port has not realized responsible innovation completely.

To assist Chinese ports in realizing responsible innovation, Multi Actor Negotiation Committee (MANC) mechanism is recommended for its advantage that MANC offers an effective channel for stakeholders to communicate with others and strategically make compromises which would bridge the value gaps.

Interview and questionnaire are two instruments applied in collecting data and all the analyses are based on reasonable inferences and assumptions.

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# 1. Introduction

**The cooperation between China and other countries in sea port construction has become an irresistible trend (Zhao, X., & Wang, X.W., et al., 2017).**

By the end of 2019, China has cooperatively constructed 58 sea ports which are distributed in 38 countries on 6 continents. Especially since 2015, the number of China's cooperative construction ports has increased rapidly from 9 in 2012 to 58 in 2019, at an average annual growth rate of 7% (Liu, C., 2020). In terms of regional distribution, most cooperative projects are mainly distributed in Asia, Europe, and North Africa.

**Increasing international cooperation in sea port construction has brought tons of benefits to all participants.**

Firstly, for the city or the port itself, new facilities can significantly improve local infrastructure, make up for shortcomings of local transportation and provide better logistics for the country or region where the port is located. Industrial development and urban construction in the nearing field can promote industrialization and urbanization level of the entire region, enhance the comprehensive competitiveness of the port and the region and improve the allocation capacity of global shipping resources (Liu, C., 2020). Moreover, through the cooperation in the construction of ports and rear industrial parks, one country's production capacity has been enhanced and cooperation with local enterprises has further expanded the consumer market and promoted the continuous improvement of its industrial competitiveness.

Secondly, for international enterprises, they have improved the level of internationalization and helped built a modern supply chain in China. These companies can go global, increase cooperation with Chinese local companies, strengthen international employee recruitment and capital entry, and continuously improve the level of international operation and management ability. The proportion of overseas assets, revenue, and business volume continues to increase, enhancing the international competitiveness of these companies (Mooney, T., 2017).

Lastly, for local people, these international cooperation projects can also offer working opportunities, improve their livelihood, promote social bonds and cultural exchanges. When cooperating in the construction of port projects, international operating companies would like to hire some Port laborers, which will bring positive impacts to local communities. Furthermore, some international giants would attach

great importance to environmental protection and the improvement of local people's livelihood, continue to cooperate to improve local infrastructure such as transportation, hydro-power, oil and gas, support the development of local medical, health, education and other public welfare, and increase cultural exchanges between the two sides (*Liu, C., 2020*).

Chinese government is keen to create a sound business climate to activate commercial organizations' passions in expanding their businesses internationally. The foundation of Asian Infrastructure Investment Bank (AIIB) is a practical action taken by Chinese authority to financially support commercial organizations to invest infrastructure constructions at foreign countries (*Huang, Z., & Tan, Z. et al., 2013*). Many nations responded actively and joined the AIIB (*according to AIIB official website, 67 countries have officially joined the AIIB by 2020*) and some even played an important role as the shareholder (*Huang, Z., & Tan, Z. et al., 2013*).

Encouraged, included but not limited by these actions, increasing international companies proposed a "Step Out Strategy", which shows their enthusiasms in expanding their businesses (*Cosco Report Team, 2011*). A series of bilateral cooperative projects such as China-Pakistan economic corridor (CPEC), China-Malaysia Railway cooperation (CMR) and China-Thailand railway project (CTRP), have been settled down and achieved great success (*Zhao, X., & Wang, X.W., et al., 2017*).

**On the other hand, international cooperation increased the complexity and uncertainty of infrastructure construction project, which posed a new challenge to ports and companies. Different from previous Chinese domestic projects, many projects were exposed in a multi-stakeholder's context. Increasing stakeholders stepped in and unexpected failures also occurred in some cases.**

Take Piraeus Port as an example, Cosco's involvement in Piraeus is a successful reference for Chinese companies expanding their transport business. However, unexpectedly, Greek citizens, did not perceive this cooperation as an inspiring opportunity which will save them from the debt trap, instead, they regard it as a threat. According to Reuters' report (*Koutantous A., 2016*), people gathered on the street demonstrating against the deal, some of them even came into collision with the police.

Cosco's Piraeus project, which should have been a case of Chinese company successfully expanding its global business territory, benefited the host country. However, it turned out to be an example as it failed in managing social resistances.

With the enhancement of communications between China and foreign countries as well as the better material conditions of Chinese people (*China's GDP per person*



*experienced a sharp increase from USD 8066.94\$ in 2015 to USD 10500.40\$ in 2020, data is collected from Kuaiyi Database, see website at [https://www.kylc.com/stats/global/yearly\\_per\\_country/g\\_gdp\\_per\\_capita/chn.htmlper](https://www.kylc.com/stats/global/yearly_per_country/g_gdp_per_capita/chn.htmlper)), the awareness of sustainable development, environmental protection and social harmony are awakened. Chinese people have paid more attention on social responsibility, environment and corporate governance issues (Song, L & Ravesteijn, W, 2015).*

*"In June 2013, people came into collision with the police in Shatian, one of port cities at Guangxi province, China. The background of this clash derives from the conflicts which arouse in the framework of local port development. Local authority and construction company failed in filling their economic, environmental and social responsibilities (Ravesteijn, W., & He, J. et al., 2014). "*

**However, in China, the traditional way of thinking in managing port construction project cannot fit in the new context. Environmental and social issues were still underrated both in sustainable development principle and scientific development strategy.**

First of all, in China, environmental and social impacts are taken into consideration, but the departure of the decision whether to drive a project or not is still from economic benefits. Besides, environmental and social impacts to some stakeholders did not receive enough attention. For example, at Shatian port extension project, sustainable development principle was explicitly mentioned in its project plan, while authority still ignored the negative social impacts on local communities (Ravesteijn, W., & He, J. et al., 2014). The conflicts which arose in the local port development strongly influenced the productions and livings of local communities. As a result, the project which intended to benefit all stakeholders, suffered social resistances (Ravesteijn, W., & He, J. et al., 2014).

**As the development represents the general trend, environmental and social conflicts interrupted the project construction. Therefore, Responsible Innovation is introduced in this study and applied in terms of balancing the developing economy and improving the livability of the Chinese ports.**

As the increasing uncertainties and complexities were added into port construction projects, more stakeholders are involved. They have diverging objectives, resources and values. Value conflicts among them are increasingly intensive. In this way, Chinese ports are obliged to seriously consider critical stakeholders' (who are also affected by the project) economic, environmental and social values and from their best efforts to bridge the gaps, when executing a port construction project (Zhu, Q., & Zhang, Q., 2015). Responsible innovation is such an approach which has been

successfully applied in Rotterdam Port Extension “Maasvlakte 2” Project (*Ravesteijn W., 2017*). In Rotterdam Port Extension “Maasvlakte 2” Project, Responsible Innovation is proved to be effective which serves the double target of port management: strengthening the economic position of the port in international trade network and improving the quality of the living environment (*Song, L & Ravesteijn, W, 2015*).

**In this study, a framework for evaluation of "Responsible Innovation" is designed referencing the study (*Song, L & Ravesteijn, W, 2015 and Ravesteijn W., 2017*), and applied in the case of "Shenzhen Yantian Port Extension Project".**

Case study is applied in this research. As the case, Shenzhen Yantian Port Extension project is introduced and being evaluated under the Responsible Innovation framework which is designed in this study. The framework involved three analyses, which are Stakeholder Analysis, Impact Assessment and Value Conflict Analysis. In addition, two interviews and three questionnaires are made for the purpose of collecting first hand data (*see at Appendix 1,2 and 3*). The data is analyzed in three analyses. The result of three analyses is evaluated under the criterion of Responsible Innovation and to answer the research question "*whether Shenzhen Yantian Port Extension project has realized Responsible Innovation or not*". The conclusion of the study shows that the framework designed is indeed helpful for answering the general question "*to judge whether a Chinese port has realized Responsible Innovation or not*". Furthermore, recommendations aimed at solving value conflicts, which is the core of responsible innovation, are proposed.

**However, due to covid-19 and some other reasons, this study still has some limitations. Therefore, more studies are needed.**

For example, because of travel restrictions and quarantine policy of covid-19, going abroad and interviewing international companies (such as HP in this case) face to face is impossible. However, despite these difficulties, this study still found some substitute ways to continue the study and adopted some innovations. Value Conflict index (VCI) is such an innovation which is firstly proposed and applied under the Responsible Innovation framework.

Further study is recommended to complete the face-to-face interviews and to apply Responsible Innovation to other Chinese ports.

## **1.1 Research Background**

As the traditional Chinese ports are still developing under "economic centralized"

principle, environmental and social value conflicts with other stakeholders are much underrated, therefore, an advanced port project management approach is needed. Responsible innovation is such an approach targeting at reconcile the value conflicts between port manager and other stakeholders (*Ravesteijn W., 2017*).

## **1.2 Current situation of Chinese port management: From "Economic Development Centralized" to "Sustainable Development", to "Scientific Development Strategy"**

Since China's "Political Reform and Opening-up to the world", port related projects were designed and executed under "economic development centralized" principle (*Yang J., 2007*).

While as the environmental issues raised increasing public attention, Chinese authorities, especially central government, realized the importance of the environmental protection and resources preservation. Therefore, they proposed "Sustainable Development Strategy" in 1996 (*China's sustainable development report, 2012*).

From then on, port related projects were implemented under sustainable development principle. In 2004, "Scientific Development Strategy" was proposed and treated as China's fundamental strategies in country governance and development. This strategy increasingly focused on economic fabric adjustment and simultaneously considered the environmental and resources aspects (*Yang J., 2007*).

Due to the fact that the social conflicts increased the tensions between the authorities and the local people, also particularly under Chinese settings, sustainable development mainly focuses on environmental protection and resources preservation while neglecting the social aspect (*Song, L & Ravesteijn, W, 2015*). Therefore, sustainable development as a fundamental principle in terms of executing port project is insufficient. When compared, Responsible Innovation is a more appropriate approach which embraces economic, environmental and social aspects.

## **2. Research Problems**

In this chapter, research question is explicitly proposed in problem statement and research objectives, which are specific sub-questions for this research. Research method and framework of this study are well explained next. After all, arrangement of

the whole paper is introduced.

## 2.1 Problem Statement

Chinese authority is keen to promote facilities of its sea ports. A series of port extension and construction projects were proposed, such as Shenzhen Yantian port extension project, Yangshan port extension project, etc. (Song, L & Ravesteijn, W, 2015). Also, international enterprises have become increasingly interested in playing an important role in foreign transportation construction project in China (Xu, 2016). They intended to exploit their advantages in capital and technologies and to benefit both local countries and themselves. Increasing communications between China and other countries impose precious opportunities to both sides, however, due to various reasons, some of them seemed failed in realizing its economic, environmental and social obligations, and led to the dissatisfaction of the people and hindered its further development overseas.

Thus, this paper targets at answering the following question:

- *Have Chinese ports seriously considered the value conflicts with other stakeholders and realized Responsible Innovation?*
- *How can Chinese ports from their best efforts bridge the value gaps, realize Responsible Innovation?*

## 2.2 Research objectives

In this study, Shenzhen Yantian port extension project is introduced as the case to evaluate whether Chinese ports have realized Responsible Innovation and how can they realize Responsible Innovation.

To answer the research questions, there are three objectives to achieve in this study:

**(1) To accurately describe and analyze what happened in this project;**

- *Who are influenced by this project?*
- *What impacts does this project bring to them?*
- *What are their value conflicts with the problem owner (Chinese port authority)?*

**(2) According to the description and the study framework, define criterion of responsible innovation and apply criterion to judge whether Shenzhen Yantian**

**port has realized Responsible Innovation;**

**(3) Give reasonable recommendations to Chinese ports in terms of achieving Responsible Innovation.**

To achieve this goal, this paper needs to meet certain requirements:

First of all, as understanding builds on description, in this way, the description is required to be as accurate as possible. All the data should be reliable. Therefore, interview and questionnaire, these two instruments of collecting data are applied.

In addition, the analysis made in this study works for, on the one hand, finding the essential reasons which may lead to fierce conflicts and could lead to failure of Responsible Innovation; on the other hand, offering specific recommendations to them to prevent controversies from happening. Therefore, the analysis should be objective and panoramic (including economic, social and environmental aspects).

The higher goal this paper would like to achieve is to generalize the lessons learned from the case to other projects when Chinese port confront the similar situations in their port expansion project under a more complex environment. This research is dedicated to offer tips to Chinese port in breaking through their common bottleneck: achieving their developing objectives while simultaneously and seriously considering other stakeholders' feelings, from their best efforts to avoid conflicts with other stakeholders.

## **2.3 Research Framework and Methods**

In light of the research question "*Have Chinese ports seriously considered the value conflicts with other stakeholders and realized Responsible Innovation? - How can Chinese ports from their best efforts bridge the value gaps, realize Responsible Innovation?*", the approach used in this study is Case Study.

This chapter firstly introduced case study approach to accomplish research concerning port projects, then the framework of this paper is put to show a better clue of the whole research. At last, research methods and overview of research steps are summarized.

### **2.3.1 Case Study Approach of the Research**

Shenzhen Yantian Port Extension Project is introduced as the case here. The case study is a research strategy which focuses on understanding the dynamics present

within single settings (*Kathleen M., 1989*). Case studies are not only about processing interviews but also about providing directions for analyzing qualitative data (*Steenhuis, H. & D EJ Bruijn, 2006*).

(1) It involves different levels of analysis, from case level to general level (*Kathleen M., 1989*). The research can not only provide practical insights in terms of solving puzzles in Yantian Port (project level), but also offer valuable lessons to similar projects (general level). Researchers are supposed to make a generalization based on an individual case and the case study can help with scientific development (*Flyvbjerg, B., 2013*). Thus, Yantian Port project can be used as the case to study general situation of Chinese Ports.

(2) It can be used to accomplish various aims: to provide descriptions, to test theories or to generate theories. It employs an embedded design (*Kathleen M., 1989*).

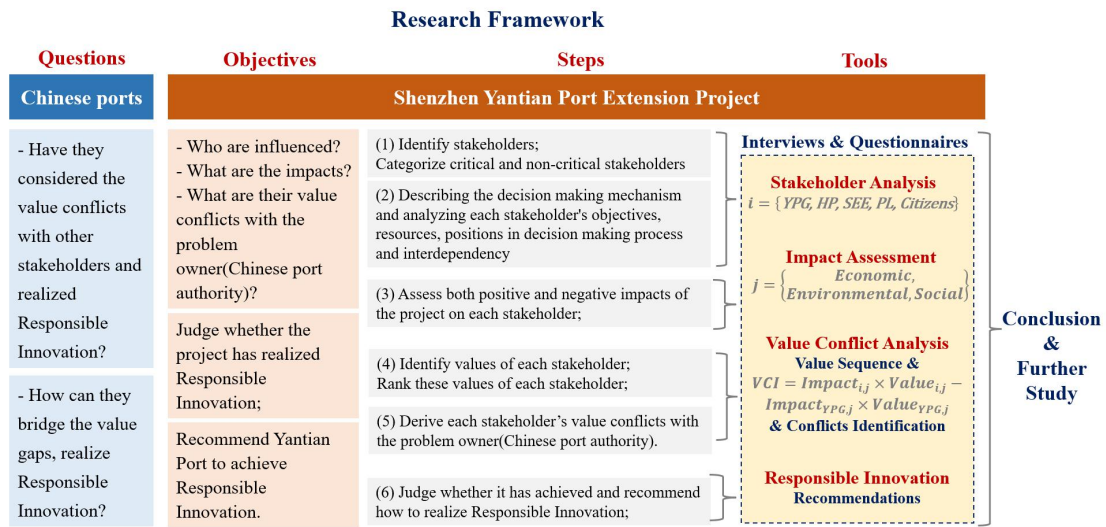
In this particular study, Shenzhen Yantian Port Extension Project is explicitly described. From the description, a deeper understanding of the research question can be formed. Under these settings, responsible innovation, can be applied and tested in the study, for the purpose of diagnosing, analyzing and solving the problems. A general conclusion which aims at helping mitigate social conflicts in Chinese companies' port project are designed. Based on the analysis and conclusion, an updated mechanism aiming at solving Chinese companies abroad port management is generated. The conclusion developed from case study is likely to have important strengths like novelty, testability and empirical validity. It arouses from the intimate linkage with empirical evidence. It is particularly well-suited to new research area or research area for which existing theory seems inadequate (*Kathleen M., 1989*).

(3) In combination with the data, it is scientific and convincing (*Kathleen M., 1989*). By embedding data in the analysis, the research is more quantitative and measurable. The accumulation of knowledge involves a continual cycling between theory and data (*Steenhuis, H. & D EJ Bruijn, 2006*).

### **2.3.2 Research Framework**

The whole research framework is set as the following figure. According to the main logic of this paper, the case of Shenzhen Yantian Port Extension Project is studied to illustrate and answer research questions of Chinese ports.

Fig 2-1 Research Framework



Referencing the successful application of responsible innovation in other cases, such as Rotterdam Maasvlakte 2 (the Netherlands) (Ravesteijn W., 2017), Nansha port (China) (Ravesteijn. W., 2014), in which methods of stakeholder analysis, impact analysis and some other steps are accomplished to derive conclusions, in combination with the facts of Shenzhen Yantian port extension project, this research is conducted under a six-step analytical framework to analyze the case and answer the proposed question, the purpose of which is to figure out the economic, environmental and social conflicts within stakeholders of Shenzhen Yantian port extension project. Definitions of relative indicators are carried out. Detailed methods this research uses will be illustrated in the following six steps to achieve the procedure of Responsible Innovation regarding the case of Shenzhen Yantian port extension project.

Step one and step two are about Stakeholder Analysis which lists the stakeholders involved and determines objectives in decision making process.

- (1) Stakeholders involved in the project are identified (Enserink B. et al, 2010).
- (2) Stakeholders' objectives, which mean what they wish to achieve under certain circumstance (Varvasovszky, Z., & Brugha, R., 2000), resources, position in decision making process and their interdependency are analyzed for the purpose of explaining the underlying facts and answering the research questions.

Step three is about Impact Assessment which enumerates the economic, environmental and social impacts brought by the project on stakeholders. Social and economic issues are paid more attention besides EIA in impact assessment processes (Morrison-Saunders, A., & Fischer, T. B., 2010; Payrau De Au, S., & Werf, H., 2005). Both positive and negative impacts of the project on the stakeholders are assessed.

Step four and step five are about Value Conflict Analysis which identifies values and

figures out conflicts within the stakeholders.

- (1) Values of the stakeholders are identified and ranks of these values are achieved.
- (2) Value conflicts within the stakeholders are discovered according to combined effects of impacts and influence level of value towards stakeholders which are derived from previous steps.

Step six is to bring up constructive suggestions for the underlying conflicts.

According to the criterion, it can be judged whether Shenzhen Yantian port realized Responsible Innovation. Recommendations and detailed suggestions are brought out to resolve the value conflicts and realize responsible innovation under a governance mechanism. Summarizing the critical findings with regard to the problem formulation and proposing a possible conflict resolving solution are carried out.

### **2.3.3 Analytical methods of responsible innovation**

Three analytical methods applied are mentioned in previous steps introduction, they are Stakeholder Analysis, Impact Assessment and Value Conflict Analysis (*Ravesteijn W., 2014*). After finishing these analyses, value conflict resolution is brought out.

#### **(1) Stakeholder Analysis**

In management theory, stakeholder analysis has been recognized as a systematic tool to follow steps to analyze characteristics of different kinds of stakeholders, individuals or organizations and figure out how they play parts in decision-making processes (*Brugha, & Varvasovszky., 2000*).

In this section, the stakeholder analysis is going to unfold with extra attention focusing on stakeholders' objectives, resources and positions in decision-making process and interdependency among them. Referencing the stakeholder analysis method applied in Rotterdam Maasvlakte 2 project, Nansha project, Yangshan project (*Ravesteijn, W., & He, J. et al., 2014; Song, L & Ravesteijn, W, 2015; Ravesteijn W., 2017*) and guidelines of stakeholder analysis proposed by Kammi Schmeer (*Schmeer, K., 2000*), the framework of this stakeholder analysis is:

Fig 2-2 Framework of stakeholder analysis





## Planning the process

This section embraces three specific steps, which are

- Define the purpose;
- Train a working group;
- Develop a plan and timeline (*Schmeer, K., 2000*).

### 1) Define the purpose

The purpose of making this stakeholder analysis is targeting at reaching the first objective of the study:

**"To accurately describe and analyze what happened in this project"**, specifically,  
*"Who are influenced by this project?"*

As well as judging

**"Whether Shenzhen Yantian port has realized responsible innovation"**

based on the criterion

*"Did all the critical stakeholders come into problem owner's sight?"*

Therefore, results are going to be presented at the result section:

1. Inventory of stakeholders involved;
2. Objectives of the stakeholders;
3. Resources of each stakeholder;
4. Positions of each stakeholder in the project decision making phase;
5. Interdependency between problem owner and other stakeholders;

### 2) Train a working group

This is an individual study, there is no need to train the group. Interview, distribution

of questionnaires, data and information analyses are all conducted by the author.

### 3) Develop a plan and timeline

The plan is divided into three phases,

Phase one: literature review and form the analytical framework (1-2 weeks);

Phase two: collecting data (2-4 weeks)

Phase three: analyzing the stakeholders using the data (2-4 weeks)

## **Defining the project/stakeholder;**

### 1) Definition of the project

The project in this study as well as in interviews and questionnaires is Yantian Port Group (YPG) East Expansion Project.

### 2) Definition of the stakeholder

The word “Stakeholder” was first showed up in casino, which means “a person who holds a stake or stakes in a bet”. The current definition is “person or organization with a vested interest in the policy being promoted” (*Buckles D., 1999; Schmeer, K., 2000*).

In this study, the term “stakeholder” is defined as

*“a social entity, a group of people with the same identity or an organization, who has explicit and independent interests, objectives, resources and positions in project decision making process”.*

## **Adapting the tools and collecting the information;**

Interview and questionnaire are two tools adapted in this stakeholder analysis for different targeted stakeholders.

The details of adapting tools and collecting the information are explained in 2.4.2 interviews and questionnaires.

## **(2) Impact assessment**

Environmental impact assessment (EIA) is regarded as an important basis for decision-making processes. There are different types of environmental impacts, for instance, natural and man-made impacts. Impacts could be assessed for environmental projects (*Kassim, T.A., & Simoneit, B., 2005*). Some methods of EIA also consider economic and social objectives to assess more completely about the sustainability of the underlying studying question. Moreover, indicators with criteria are to evaluate whether the objectives have been reached (*Payrau De Au, S., & Werf, H., 2005*). Thus,

economic, environmental and social impacts are taken into account in this section.

In the process of the construction and operation of Shenzhen Yantian port, various impacts show up for stakeholders mentioned above. Impact assessment is to be conducted to answer question:

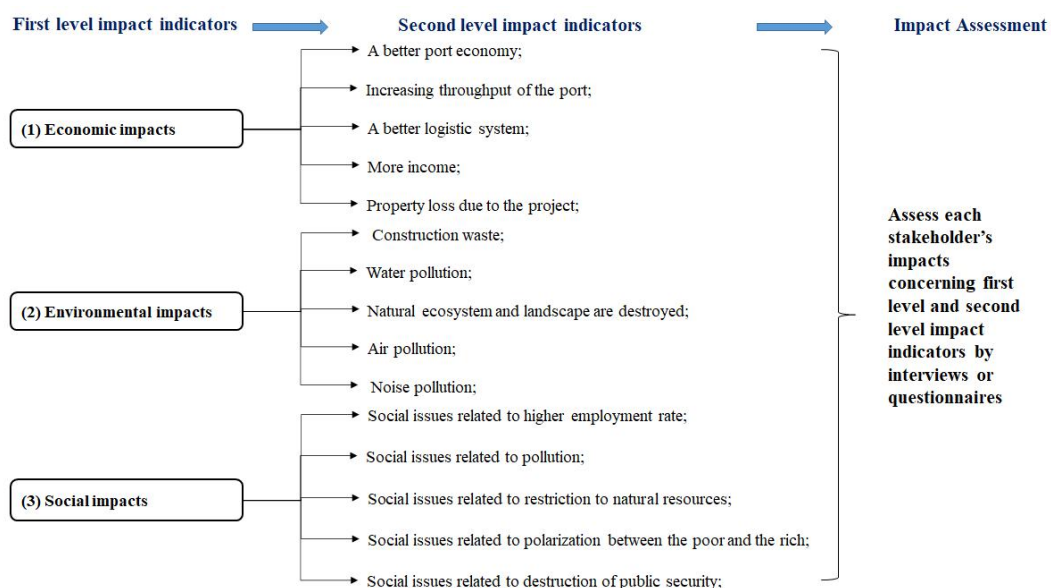
- *What impacts does this project bring to them?*

According to International Association for Impact Assessment (IAIA)'s Strategic plan summary (*Retrieved from <https://iaia.org/downloads/Strategicplansummary.pdf>*), IAIA emphasizes environmental, social, economic, cultural, and other impacts. Those impacts could play parts in decision-making processes. In this paper, three impact dimensions are discussed: Economic impact, social impact and environmental impact. Those are first level impact indicators. Later on, second level impact indicators are added for impact analysis for each stakeholder. At last, each stakeholder's impacts concerning first level and second level impact indicators are assessed by interviews or questionnaires.

An impact assessment is to be conducted for the purpose of:

- Firstly, numerating the impacts brought by the project;
- Secondly, analyzing each stakeholder's perspectives towards every impact.
- Thirdly, estimating the extent to which each impact brought on every stakeholder (*Appendix 1, 2 and 3*).
- 

Fig 2-3 Framework of impact analysis



The specific impacts which stakeholders possess are also derived from interviews or

questionnaires. Furthermore, the assessment is classified by positive impacts and negative impacts. The direction and level of impacts are numerated by setting up a 7-point scale question.

We list the inventory of stakeholders who are influenced by each impact. However, though we enumerate all the stakeholders who are influenced, for different stakeholder, to which extent certain impacts affect them are incomparable. Certain impacts may lead to directly touchable gains or losses of them, for example, some people immediately lost their jobs and living incomes because of the project expropriated the private land; certain events may not impose significant effects in a short term, such as pollution. Thus, in order to assess to which extent certain impacts affect them, this research quantified the impact degree.

Specifically, this paper assigns a number with signs ahead representing the influential degree of certain impacts on each stakeholder. Stakeholders either benefit or loose from these impacts. Plus and minus signs represent whether the stakeholder benefited or suffered. Positive impacts (correspond in achieving stakeholders' objectives) which brought benefits to stakeholders are stated with a positive sign, otherwise, it is a negative sign.

In the appending questionnaires, people who fill out the questionnaires are supposed to sequence or assess level of impacts according to their opinions.

In addition, losses and gains are categorized in three degrees, from "3" to "1". The number represents the degree of impact: "3" = "direct and substantial" and "1" = "indirect and little". "2" means the degree of impact are between "1" and "3". "0" represents that stakeholder was not influenced by this impact. According to this criterion, we assess the degree of impact on all the stakeholders.

Table. 2.4 Influential degree of impacts

Favor/infavor	Degree	Description
Positive	(+)3	Direct and substantial benefit from the impact
	(+)2	Benefit from the impact
	(+)1	Indirect and merely benefit from the impact
Neutral	0	Not influenced by this impact
Negative	(-)1	Indirect and merely suffer from the impact
	(-)2	Suffer from the impact
	(-)3	Direct and substantial suffer from the impact

Table 2.5 Impact assessment

Impact /	Stakeholder 1	...	Stakeholder N
----------	---------------	-----	---------------

Impact /	Stakeholder 1	...	Stakeholder N
Impact A	(+3)	(+2)	(+1)
...	0	0	0
Impact X	(-3)	(-2)	(-1)

### (3) Value conflict Analysis

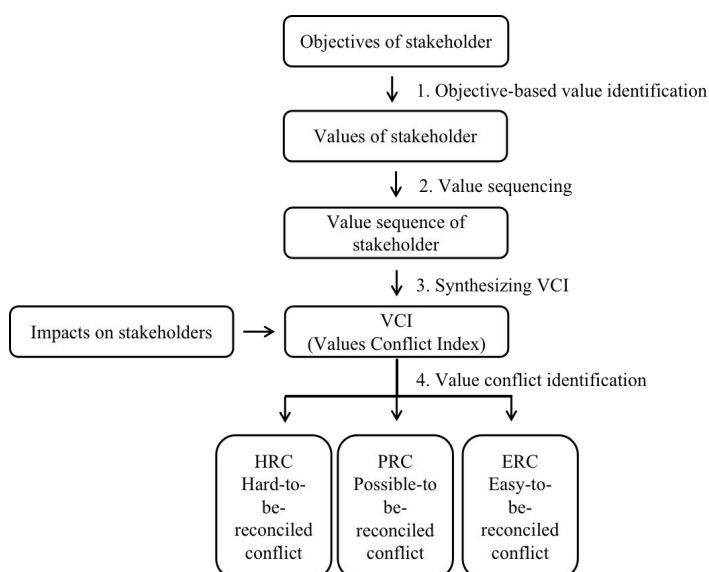
Conflict analysis can be applied in case study to investigate underlying conflicts within different interest groups. A public engagement program of urban planning in Hong Kong is described and conflicts are analyzed to avoid certain group's opinion domination (Tarn, C.M., Zeng, S.X., & Tong, T., 2009). This paper has delivered value conflict analysis by considering combined effects of impacts from different aspects and relating value importance for each stakeholder.

Value Conflict Analysis is going to answer the questions:

- What are their value conflicts with the problem owner (Chinese port authority)?

Referencing professor Wim Ravesteijn's literature "a strategy for responsible port innovation" in terms of methods for bridging value conflicts (Ravesteijn W., 2017), to bridge the value conflicts among stakeholders, a four-step framework is proposed:

Figure 2-6 Framework of Value Conflict Analysis



The first step is to identify the value based on stakeholder's objectives.

The second step is to sequence stakeholder's values according to the answers from interviews and questionnaires. Value ranks are gotten by setting up a 3-point scale question, the answer of which can be extended as the importance sequence of different values.

The third step is to synthesize the impacts on stakeholders and their value sequences, forming VCI (Value Conflict Index). The combined effects of impact and value are implied by multiplying the two numbers from Stakeholder Analysis and Impact Analysis respectively regarding each stakeholder's various impacts. Regarding the outcomes of Stakeholder Analysis and in combination with the Impact Assessment, conflicts among stakeholders are found according to the criteria this paper define considering the difference of stakeholders' combined effects of value.

The final step is to identify value conflict between problem owner and other stakeholders. Value conflicts are divided into three types: HRC (Hard to be reconciled value conflict), PRC (Possible to be reconciled value conflict) and ERC (Easy to be reconciled value conflict), according the difference value between problem owner's VCI and other stakeholders' VCI. In this study, we define:

- HRC is the VCI difference value over 8 (included);
- PRC is the VCI difference value between 6(included) and 8;
- ERC is the VCI difference value smaller than 6.

#### **(4) Value conflict resolution**

For different types of value conflicts, on the one hand, this research is going to design a new governance mechanism to re-balance the power system and protecting every stakeholder's core value; on the other hand, for each type, specific solutions are proposed.

To answer above questions, two instruments are applied and mentioned already: Interviews and questionnaires. For those stakeholders who consist of a lot of individuals, for instance, citizens, Port laborers and Self-Employed Entrepreneurs could be provided with questionnaires to answer relative questions of the research. For those special stakeholders, certain companies for example could be represented by people who occupy important positions.

Detailed questions about interviews and questionnaires are put in Appendix and basic information about interviews and questionnaires are introduced as following.

### **2.3.4 Interviews and Questionnaires**

In this case, Yantian Port Group (YPG) is representing the port admin and China State Ship-building Company (CSSC) is a substitute of Hutchison Whampoa Port cooperation (HP), the constructor of this port extension project, as HP is an international company located at Hongkong and due to covid-19, the accessibility from Shenzhen to Hongkong is shut down. Furthermore, when compared with other stakeholders, YPG and Chinese shipping company are individuals, not a group of individuals, therefore, interview is the most suitable way to collecting their data which is targeting at answering upward questions (see Appendix 1 and 2).

For YPG, this study invited Chen Lei, the senior manager of the company and the responsible person for this specific project. In the interview, Mr. Chen is asked questions covering stakeholder analysis, impact assessment and value analysis. Precise questions could be found in Appendix 1.

For CSSC, this study invited Chen Jingyu, the senior strategic investment manager who is responsible for the investment and construction of the Shenzhen port extension project. Details of the interview record could be found in Appendix 2.

In this study, there are three stakeholders who are considered the representatives of three kinds of stakeholders, they are Self Employed Entrepreneurs (representing the other local commercial organizations), Port laborers (representing the people who are working at Yantian port) and citizens (representing the people who live nearby). As these three stakeholders are representing certain groups of people, therefore, questionnaire is the most suitable approach to collect data and information which could help derive answers to the data questions (mentioned above).

In this study, questionnaires 3-1 and 3-2 are designed for citizens, Self Employed Entrepreneurs and Port laborers. Questionnaire 3-1 is to find out stakeholders' objectives and values. Questionnaire 3-2 is to figure out stakeholders' impacts and their level. Around 100 questionnaires are collected to citizens and Port laborers respectively for 3-1 and 3-2 because number of individuals is large enough to support the sample. For Self Employed Entrepreneurs, only around 50 questionnaires are collected considering the limited number of Self Employed Entrepreneurs which are surrounding Yantian District. Since the targeted respondents are restricted to people who have relations with Yantian Port Extension Project, this paper distributed questionnaires by sending messages to certain Wechat Groups respectively. Surrounding citizens are selected in Yantian district communities relating groups. Port laborers are selected in groups of companies which are based in Yantian District. Self Employed Entrepreneurs are selected in groups of company exhibitions in Yantian or

Shenzhen.

Questionnaires are distributed through the questionnaire service provided by "WJX.cn" enterprise edition. For Self Employed Entrepreneurs, around 50 sample data are available for analysis for Questionnaire 3-1 and 3-2. For Port laborers, around 100 sample data are available for analysis for Questionnaire 3-1 and 3-2. For citizens, around 100 sample data are available for analysis for Questionnaire 3-1 and 3-2.

Validation standard in this study is:

1. The interviewee is willing to fill in the form;
2. The answers to the questions meet the question requirements;
3. All the answers are in a good order and expression are easy to understand, not vague.

Table 2.4 Data validation

Questionnaire	Target group	Number of questionnaires distributed	Number of collected back	Validated number	Validate ratio
3-1	Self Employed Entrepreneurs	80	57	55	68.75%
	Port laborers	150	110	106	70.67%
	Citizens	150	113	105	70.00%
3-2	Self Employed Entrepreneurs	80	55	53	66.25%
	Port laborers	150	111	108	72.00%
	Citizens	150	115	106	70.67%

## 2.4 Arrangement of this thesis

This research consists of seven chapters and divided into three sections.

The first section is mainly about the Introduction, Research Problem and Literature Review, covers the first three chapter. It starts with an Introduction, which includes background information and a brief illustration of the study. The second chapter is Research Problem. Research question is explicitly proposed and the objective, research method and framework of this study are well explained. In addition, as three analyses are going to conduct in the second section, in this chapter, data collecting approach is also introduced. The following chapter is Literature Review. Knowledge gap is exposed in this part and responsible innovation is introduced explicitly.

The second section is case study and analyses, which is chapter four and chapter five. The fourth chapter is case introduction and problem formulation. Shenzhen Yantian port extension case is introduced and the problem is formulated as the departure of the study. Three analyses are conducted in the fifth chapter. The first analysis is the



Stakeholder Analysis; the following is Impact Assessment; the last analysis is Value Conflict Analysis.

The final section is the conclusion & recommendation. This section embraces one chapter, which is chapter six. At chapter six, the conclusion is presented and discussed. Recommendations are proposed. Furthermore, limitations and further research of the research are presented and discussed.

### **3. Literature Review: "Responsible Innovation" of port projects**

**Sea port is the most common cooperative field. Therefore, traditional port development theories are no longer suitable. Cooperation is an unavoidable trend; many sea port cooperative development voices began to appear.**

From cross-border cooperation perspective, Qiu Xuewei proposed the Pan-Beibu Gulf economic cooperative mode. Pan-Beibu Gulf mode advocates Chinese companies should actively export their technologies and capitals to some South-East Asian countries in terms of assisting them in promoting their port service and build a regional port cluster (*Qiu X., 2007*). Wang Liehui and Mao Bohui applied the lessons learned from New York-New Jersey port, got the same conclusion and recommended port managers to consider to integrate themselves with their neighbor ports, forming a port cluster, which will have bigger advantages in international trade competition (*Wang L. & Mao B., 2010*). After all, a boomer regional economy will potentially benefit surrounding countries. Chen Jihong and Zhen Hong believe ports have greater potential to be the crucial nodes in future international trade network. Based on the retrospect of the developing history of APEC accession countries' ports, they concluded that ports will possess competitive advantages and therefore, they will play increasing important roles in international trade (*Chen J. & Zhen H., 2009*). Liu Jun made further research on European ports. By analyzing the cooperation and competition before and after EU formation, he recommended port admins should shape their differentiation advantages and become a part of port cluster instead of an isolated one (*Liu J., 2013*).

**As sea port cooperation has become a new fashion, it brings new challenges to the port admin. How to manage the port has become a rising concern among port managers. There are three mainstream port management modes currently worldwide. They are landlord mode, self-operating mode and secondary mode.**

Landlord mode is the most common mode which is widely applied. The U.S. New York-New Jersey port is a typical landlord mode port. Under this mode, port bureau replaces the government to directly operate the port, but without the authority to collect the tax (*Ma Y., 2011*). The bureau affords its cost by itself. However, it owns the land proprietorship, and it possesses the operating right of the land, highway or airport around the port. The bureau earns the money to cover its own expenses (*Ma Y., 2011*).

Los Angeles, Miami and New Jersey are managed under another mode called self-operating mode (*Ma Y., 2011*). State government establishes a state-hold company, the company runs the port and contributes the profits to the state. The land proprietorship still belongs to the State government. However, the company is taking charge of the port and responsible for construction and operation. The company hires employees and constructs as well as operates the port (*Ma Y., 2011*).

As the biggest port around the world in the past, Rotterdam is a typical secondary mode port. Municipality is the highest authority of the port; it has the ownership of the land and infrastructure of the port. Most importantly, municipality is the only authority who has the legislative power. By contrast, The Rotterdam Port Authority (RPA) is the “landlord” of the Rotterdam Port (*Nathan Bowden & Martin de Jong, 2006*). Originally it was a branch of service of the Rotterdam municipality, but since 2004 it has been an independent company with two shareholders: the municipality of Rotterdam and the Dutch State (*Ravesteijn W., 2017*). Therefore, RPA is the real admin of the port who takes responsibility of the operation of the port.

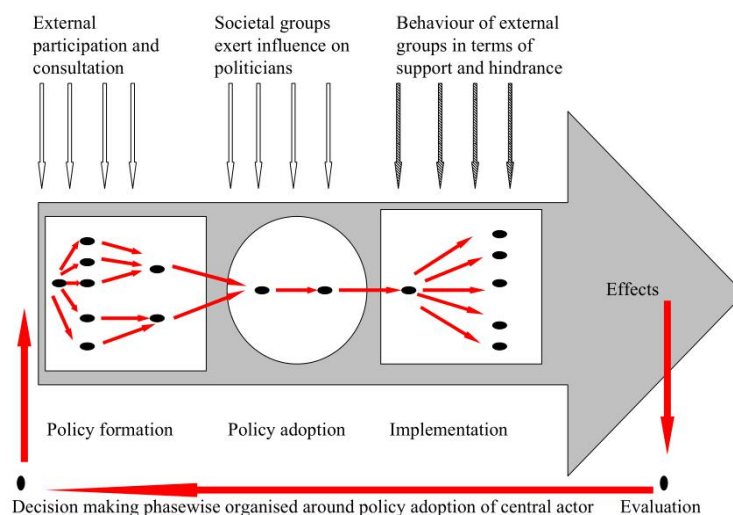
In China, since the “Political Reform and Opening-up to the world”, Chinese ports are divided into two categories: “Central government directly governance” and “Secondary governance, Municipality centered”. Financially, Chinese ports are responsible for their own profits and losses. Chinese state hold companies are introduced into the port in terms of construction and operation of the ports (*Zhang, J., 2000*).

**In this study, a specific case is introduced. In this specific port, the management mode is explained in Appendix 4. Phase model is applied in terms of describing the decision-making process.**

The phase model is the most common model used in describing and understanding the decision making, scientifically (*Bryson, J. M., & Crosby, B. C., 1993*) and practically (procedures are often based on the concept of phasing). In the phase model, decision-making is represented in terms of a number of distinct stages or phases (*Mintzberg, H., Raisinghani, D., & Theoret, A., 1976*). Normally, there are three

phases, called policy formation, adoption and implementation (See Figure 4.16). Each phase has its specific characteristics and participants (Teisman, G. R., 2000).

Figure 3-1 Phase model



Source from (Teisman, G. R., 2000)

In phase model, there is a cycle within the model. Under the external participation and consultation, the initial policy is formed at formation phase. Then, the initial policy is passed to the adoption phase. Policy maker accordingly adopts or asks to revise the initial policy. At this phase, social groups are able to exert their influences on politicians. Research is made for the purpose of assessing the impact of the project, for example, Environmental assessment report (Zhou, B., & Wang, N., et al., 2006). Once the initial policy is adopted, it will become an official policy and be sent to the implementation phase. The official policy is going to be implemented and gradually becomes reality. However, it is just the end of one policy making cycle but not the end of the whole process. For the purpose of improving the quality of the policy, policy makers are obliged to evaluate the effectiveness of the policy. The feedback of the public in terms of the policy will be passed back to the policy making system and run through all the phases again (Teisman, G. R., 2000).

In different phases, resources are used by different stakeholders involved in this decision-making process. In this study, Dr Martin de Jong's literature *"Seeing the People's Republic of China through the Eyes of Montesquieu: Why Sino-European Collaboration on Eco City Development Suffers from European Misinterpretations of 'Good Governance'"* is introduced. Resources are classified accordingly and are divided into six categories. In the literature, Dr de Jong proposes a "Sextas Politica" in replace of the "Trias Politica". These six powers or resources could exert impacts

on policy making. They are legislative power, executive power, judiciary power, implemented power, consultative power and commentative power.

As international cooperation is an unavoidable trend, while social conflicts increased the tensions between the authorities and the local people, particularly under Chinese settings. Even sustainable development and scientific development strategy are proposed targeting at mitigating the conflicts between development and environment protection and resources reservation (*Yang J., 2007*). However, both of these two strategies mainly focus on environmental protection and resources preservation while neglecting the social aspect. Therefore, sustainable development as a fundamental principle in terms of executing port project is insufficient.

Sustainable development is originally defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (*WCED, 1987*). It generally embraces three dimensions: environment, society and economy, which are otherwise known as People, Planet and Profit (*Porrás, 1992*). As a concept, sustainable development unites people in their striving after a better world, but as a departure for design and development, it fails for many dilemmas appearing in its application (*Mulder et al. 2012*). Especially, sustainable development is unable to keep pace with the updating requirement of the port management under current situation.

Specifically, sustainable development is a container concept, resulting from a political compromise of rich countries and poor countries in terms of different interests: rich countries emphasize future generations: inter-generational solidarity; poor countries emphasize current and actual world poverty problems and the need for economic development: intra-generational solidarity (*Mulder et al. 2012*). Besides scientists could not make a consensus on its practical application. It is generally believed that the achievement of sustainable development requires global decision making (*Ravesteijn. W., 2014*); others believe that scientific or technological advancement will be the driving force.

**As a result, Responsible innovation is an emerging and promising field of scientific activities aimed at the design and implementation of new technologies and institutional arrangements despite of diverging values (*Owen et al. 2013*).**

It asks the question which fundamental values are involved. It aims at tackling of a socio-technological problems and reconciling diverging, competing and even conflicting values. Responsible innovation has been gaining ground in Europe (*Owen et al. 2013*). The Rotterdam port Maasvlakte 2 project exemplifies responsible innovation spirit of experiment and innovation, making port cities "Hotspots of Creative and Sustainable Local Development", as it was called at a 2012 conference

in Naples (*Van den Hoven et al., 2012*). The Maasvlakte 2 project explicitly addresses the double goal of economic and social development and it aims to be a showcase of sustainable port engineering (*Port of Rotterdam, 2014*), which has attracted global attention.

In addition, responsible innovation has proven that it can be applied in China's domestic port extensional projects: in Tianjin port (eco-ports are being developed, other ports are increasing their efforts in terms of responsible development (Nansha project: RI was applied by professor Wim Ravesteijn in his literature) (*Ravesteijn. W., 2014*).

Criteria in evaluation of responsible innovation is set as following.

To judge whether Shenzhen Yantian port realized Responsible Innovation, this study requires some criterions:

In combination with the responsible innovation framework put forward at the previous chapter (*see Fig 2-1*) and the results of interview and questionnaires, the criterion is:

- (1) Did all the critical stakeholders come into problem owner's sight?
- (2) Are impacts on all the critical stakeholders taken into consideration by the problem owner?
- (3) Are there any value conflicts between other critical stakeholders and problem owner?

In this case, conflicts are classified between other stakeholders and YPG into three categories according to the gap value which is the difference of two stakeholders combined multiple effect of impact and level of value importance:

Hard to be reconciled conflict with a relatively large gap value;

Possible to be reconciled conflict with a relatively middle gap value;

Easily to be reconcile conflict with a relatively small gap value;

In this study, if answers to the first and second questions are "Yes" and answer to the third question is "No", we would conclude that "Shenzhen Yantian port realized Responsible Innovation"; on the contrary, in other situations, we would conclude "Shenzhen Yantian port is failed in realizing Responsible Innovation" and recommendations targeting at improving the responsible innovation level of this port are proposed.

## 4. Case introduction and problem formulation

In this chapter, Shenzhen Yantian port extension project is introduced as the case, to be evaluated under the framework of responsible innovation. Background information is offered at the beginning and then research questions which are in combination with the case are proposed. Then the problem owner is clear and definite and the criterion for judging "whether Shenzhen Yantian port is responsible innovation or not" are explicitly put forward.

### 4.1 Case background: Shenzhen Yantian port extension project

#### (1) Shenzhen Port

According to *ShipHub* (Retrieved from <https://www.shiphub.co/port-of-shenzhen/>), Shenzhen Port, a port in Shenzhen City, Guangdong Province, China, located in the estuary of the Pearl River, and adjacent to Hong Kong, is one of the sea ports in the Pearl River Delta. Shenzhen Port has 8 ports of Shekou, Chiwan, Mawan, Dongjiaotou, Yantian, Fuyong airport, Shayuyong and Inland River, with a water area of 106 square kilometers and a land area of 16 square kilometers. As of October 2018, Shenzhen port has opened 239 international container liner routes, covering 12 major shipping areas in the world and more than 300 ports in more than 100 countries and regions. In 2018, the cargo throughput of Shenzhen port was 251 million tons. Shenzhen Port ranked the third largest container port in the world for five consecutive years.

#### (2) Yantian Port

As the development of the shipping industry continues to evolve towards large-scale ship and operation alliance, Yantian Port's position as a hub port is further highlighted. As a large deep-water port, Yantian Port is an important gateway for China's import and export trade. Relying on the natural deep-water berth condition and super large ship service capacity, it has become the preferred port for super large ships in South China and is also one of the busiest container terminals in the world.

According to *Yantian Port (000088.SZ) 2021 interim report* (Retrieved from *Wind database*), it undertakes more than 1/3 of Guangdong's foreign trade import and export and 1/4 of China's trade with the United States, and plays an important role in regional economy and global foreign trade transportation network. In February 2021, the cumulative throughput of Yantian Port exceeded 200 million TEUs (Twenty

Equivalent Units), creating a new world port record for a single terminal to achieve 200 million TEUs in the shortest time. Yantian International (phase I and phase II), which Yantian Port co-invests, will continue to explore and innovate and strive to continuously strengthen the core competitiveness by virtue of the developed economic hinterland, advanced and efficient terminal operation and management and trusted brand advantages.

### **(3) History of cooperation between Yantian Port Group (YPG) and Hutchison Whampoa Port cooperation (HP)**

According to the historical development of Yantian Port in Baidu Baike (*Retrieved from*

*<https://baike.baidu.com/item/%E7%9B%90%E7%94%B0%E6%B8%AF/5341810?fr=aladdin>*), in October 1993, Yantian Port Group and Hutchison Whampoa signed the joint venture contract of Shenzhen Yantian international container terminal to jointly build two 35000-ton and three 50000-ton container berths. In April 1994, Yantian Port Phase I port project passed the national acceptance.

In December 1996, the second phase of Yantian Port project was officially started, and three 50000-ton container berths were jointly built by Yantian Port Group and Hutchison Whampoa. In July 2000, Yantian Port Area Phase II project passed the acceptance and was put into use.

In November 2001, Yantian Port Group and Hutchison Whampoa signed a joint venture contract for Yantian Port Phase III project to jointly build four 50000-ton container berths. The total investment of phase III project is 5565.9 million yuan. Among them, the capital investment share ratio is 35% for Yantian Port Group and 65% for Hong Kong. The joint venture construction and operation period is 50 years.

### **(4) Yantian Port Group (YPG) East Expansion Project**

According to Alphaliner, which is a knowledge base used by many port authorities, terminal operators, logistics companies, shippers, research companies and banks and other financial institutions, Shenzhen Yantian International Container Terminal Co., Ltd. and Hong Kong based Hutchison Port holding trust (the owner of Yantian international container terminal) have resumed an old plan to build a 3 million TEU deep-water container terminal in the east of Yantian port, initially named Yantian East International Container Terminals. This is mentioned in the online news of "Attention! Shenzhen Yantian Port will build a new deep-water container terminal" (*Retrieved from <https://new.qq.com/rain/a/20210705A09K4F00>*). At present, Hutchison Whampoa and Yantian international have established a "special purpose company" to

develop Yantian Oriental international container terminal, which is expected to cost US \$1.7 billion and could take part in this extension project.

This plan was under design in the early 2000s, and most of the reclamation works for Yantian Port expansion were completed more than a decade ago. However, the project became a victim of the 2008 global financial crisis and, like many other infrastructure projects, was forced to shelve.

It is reported that the plan was first proposed in 2008, which was shortly before the outbreak of the global financial crisis. The project is located in the east of Yantian Port Group, and a 1470-meter-long berth will be built, with a storage yard area of about 120 hectares and an annual transportation capacity of 3 million TEU.

### **(5) Introduction of Yantian International Container Terminal (YICT) and its partners**

According to Yantian International Container Terminal's official website (*Retrieved from [http://www.ytport.com/jtgk/jtjs/201810/t20181026\\_39.html](http://www.ytport.com/jtgk/jtjs/201810/t20181026_39.html)*), YICT is a very famous container traffic and it is a member of HPH Trust. The Trust is supported by Hutchison Ports, which could provide YICT resources within the Hutchison Ports Group. Hutchison Ports is a division of Hutchison Holdings Limited and focused on the port business. Thus, Yantian Port and Hutchison Ports have a lot of cooperation and could generate synergy in ports worldwide.

## **4.2 Problem formulation of the Case**

According to "Research Problems" in Chapter 2, problem formulation for this special case of Shenzhen Yantian port extension project is illustrated as following. To start with, problem owner is set among all the stakeholders in this project. Specific research questions for the Case are described and Criterion in evaluation of responsible innovation is introduced to answer these specific questions.

### **4.2.1 Problem owner**

Although many parties would be involved in Shenzhen Yantian port extension project case, regarding:

- (1) Chinese port is explicit mentioned as the main research body;



- (2) The conclusion of the research is going to offer tips for Chinese ports if they encounter the same situation.

In this way, the problem owner in this research is Yantian Port Group (YPG), a Chinese state-owned company, who represents the port manager in this case (*see Appendix 1*).

#### **4.2.2 Specific research questions for the Case**

Parting the main research question into specific questions considering the current situation in Shenzhen Yantian port extension project, specific questions are proposed:

**(1) To accurately describe and analyze what happened in Shenzhen Yantian port extension project;**

- *Who are influenced by this project?*
- *What impacts does this project bring to them?*
- *What are their value conflicts with the problem owner (Chinese port authority)?*

**(2) According to the description and the study framework, define criterion of responsible innovation and apply criterion to judge whether Shenzhen Yantian port has realized Responsible Innovation;**

**(3) Give reasonable recommendations to Chinese ports in terms of achieving Responsible Innovation.**

Analyses are made for the purpose of finding the answers to these questions and recovering a whole picture of what have happened in Shenzhen Yantian port extension project.

## **5. Analyses**

(1) In this chapter, Shenzhen Yantian Port extension project is introduced as the case, under the responsible innovation framework, which was introduced in the previous chapter (Fig 2-1). A stakeholder analysis, an impact analysis and a value conflict analysis are made for the purpose of describing the underlying facts:

- *Who are influenced by this project?*
- *What impacts does this project bring to them?*
- *What are their value conflicts with the problem owner (YPG)?*

- (2) Moreover, for answering the research questions of the case:
- *Did all the critical stakeholders come into problem owner's sight?*
  - *Are impacts on all the critical stakeholders taken into consideration by the problem owner?*
  - *Are there any value conflicts between other critical stakeholders and problem owner?*

## 5.1 Stakeholder analysis

Stakeholder analysis is applied in this chapter for its advantages that it is relatively easy to make and can be applied within a wide range of problems (including but not limited to economic, environmental and social problems). It is a set of tools for generating knowledge about stakeholders - including individuals or organizations - so as to understand their behaviors, intentions, inter-relations; and for assessing the resources and influence they bring to bear the decision-making or implementation process (Varvasovszky, Z., & Brugha, R., 2000).

Shenzhen Yantian port extension project is exposed in a multi-stakeholder circumstance. Every single stakeholder has diverse objectives, which may sometimes collide. Besides, they may possess indispensable resources, have different positions in distinct decision-making phases and play certain roles in decision making, delivering or implementing process. They have formed networks and developed interdependency on each other.

Therefore, the departure of describing what has happened and what will happen in this project, YPG is recommended to make a stakeholder analysis:

- to recognize the stakeholders who are involved and form a deep understanding of them, to answer the question “- *Who are influenced by this project?*”
- to evaluate their objectives, resources and positions in the decision-making process (Schmeer, K., 2000), to answer the question “- *Did all the critical stakeholders come into problem owner's sight?*”, so that YPG is able to strategically solve the conflicts among them and drive the project.

In this section, the analysis aims at depicting an accurate portrayal of stakeholders. In this way, stakeholder analysis in this study distinguishes itself from other research methods for its additional emphasis on stakeholders' objectives, resources, positions in decision making process and interdependency among them.

### 5.1.1 Inventory of stakeholders

This study defines the term "stakeholder" at 2.4.1, stakeholder in this case represents *"a social entity, a group of people with the same identity or an organization, who has explicit and independent interests, objectives, resources and positions in project decision making process"*. Based on this definition and referencing the stakeholder mentioned at Nansha port and Yangshan port (Ravesteijn, W., & He, J. et al., 2014; Song, L & Ravesteijn, W, 2015; Ravesteijn W., 2017), this study proposed an inventory of stakeholders. Nansha port is particular as it is also a port located at Guangdong province, same as Shenzhen Yantian port.

At Nansha case, four categories of stakeholders are recognized in stakeholder analysis, they are

- (1) Authority (Guangdong provincial government, port authority),
- (2) Construction companies (Guangdong railway construction group, port construction group),
- (3) Surrounding organizations (manufacturing companies) and
- (4) Surrounding citizens (citizens, villagers, schools and hospitals) (Ravesteijn, W., & He, J. et al., 2014).

Besides, at Yangshan port, also four categories of stakeholders are recognized: authorities and governments are defined as external stakeholders; related companies and local communities are defined as internal stakeholders (Song, L & Ravesteijn, W, 2015).

Therefore, taking these two cases as examples, inventory of stakeholders in Shenzhen Yantian port is mainly consist of three categories: authority, construction organization and surrounding citizens. Specifically, inventory of stakeholders is presented as follows:

Table 5.1 Inventory of stakeholders

NO	Stakeholder	Description	Identity tag	Category
1	<b>YPG</b> <i>Yantian Port Group</i>	A Chinese state-owned company who represents the authority, is responsible for the Shenzhen Yantian port extension project. (Source: <a href="http://www.ytport.com/jtgk/jtjs/201810/t20181026_39.html">http://www.ytport.com/jtgk/jtjs/201810/t20181026_39.html</a> )	YPG is an individual stakeholder in this case.  YPG is the project owner and problem owner of this project.  To collect information of YPG, this study interviewed a senior manager of YPG.	Authority
2	<b>HP</b> <i>Hutchison Ports</i>	An international company who runs port construction, port operation, ship building and logistics businesses. (Source:	HP is an individual stakeholder in this case.  HP is the project executor of this project (Appendix 4).	Construction organization

NO	Stakeholder	Description	Identity tag	Category
		<a href="https://baike.baidu.com/item/%E5%92%8C%E8%AE%B0%E9%BB%84%E5%9F%94%E6%9C%89%E9%99%90%E5%85%AC%E5%8F%B8/2139735?fromtitle=%E5%92%8C%E8%AE%B0%E9%BB%84%E5%9F%94&amp;fromid=3477368&amp;fr=aladdin">https://baike.baidu.com/item/%E5%92%8C%E8%AE%B0%E9%BB%84%E5%9F%94%E6%9C%89%E9%99%90%E5%85%AC%E5%8F%B8/2139735?fromtitle=%E5%92%8C%E8%AE%B0%E9%BB%84%E5%9F%94&amp;fromid=3477368&amp;fr=aladdin</a> )	To collect information of HP, this study interviewed a senior manager from CSSC.	
3	SEE Self-Employed Entrepreneurs	Except YPG and HP, they are around 10,000 self employed entrepreneurs locate around Yantian port area. (Source: <a href="http://www.sz.gov.cn/szzt2010/wgkz/glgk/jgxxgk/shxy/content/post_9007111.html">http://www.sz.gov.cn/szzt2010/wgkz/glgk/jgxxgk/shxy/content/post_9007111.html</a> )	SEE is defined as the representative of all these self-employed entrepreneurs in this case. SEE did not directly participate in the project while they were influenced by the project and the influence are almost same (see Appendix 3-1 questionnaires).  In this study, the questionnaires were distributed to SEE in a wechat group which all the group members matched the definition of SEE.  SEE distinguished itself with other stakeholders for its two distinct identity tags: on the one hand, it is a business organization whose existence is for business interests; on the other hand, they are also citizens who live near the port.	Surrounding organizations
4	PL Port laborers	A huge number of Port laborers are hired by this YPG and HP. They may be from Shenzhen, or from other regions over the world but most of them are living at Yantian port area.	PL represents all laborers hired by YPG and HP in this case.  PL has two distinct identity tags: on the one hand, they have economic relationship with YPG, and HP; on the other hand, they are also normal citizens who live near the port.	Surrounding citizens
5	Citizens	People except PL who live around Yantian port.	Citizens represent people who live around Yantian port. They may come from different background, but they are all influenced by the project as they lived around. But different from PL, they do not have any relationship with YPG and HP; furthermore, they are not like SEE. They are individuals and have different value system with SEE (see at Appendix 3-2)	Surrounding citizens

## 5.1.2 Objectives of the stakeholders

### (1) Definition

Objective indicates a stakeholder's underlying motivations which drives their behaviors under certain circumstances (*Varvasovszky, Z., & Brugha, R., 2000*). At project level, it is a situation these stakeholders would like to realize or would like to maintain or would like not going to happen. From the data collecting process, this study noticed that all stakeholders that are involved in this analysis have their own clearly formulated objectives.

### (2) Collection of Information

In this study, objectives of each stakeholder come from the interviews and questionnaires.

For YPG and HP (CSSC in the interview, Appendix 1 and 2), "Objectives" are explicitly in the question and answered.

For PL, SEE and citizens, there is an independent questionnaire which is about the "Objectives" and "Values" (see at Appendix 3). In this study, a list of "objectives" are presented referencing the objectives of stakeholders at Shatian case (*Ravesteijn, W., & He, J. et al., 2014*), and at the end of the "objective section", interviewees are required to add the objective which is not shown up in the questionnaires but they believe is their objective. In this way, this question guarantees the completeness of the objectives.

### **(3) Objectives of stakeholders**

#### **● Objectives of YPG**

To determine YPG's objectives, the author contacted the senior manager of the YPG and took a short interview. The interview is taken in Chinese while the English version record is present at Appendix 1. According to the interview, objectives of YPG embrace three dimensions:

Firstly, YPG pursues lower cost, higher revenue and increasing profit of the project. These three objectives are mainly short-term economic objectives.

Secondly, from a long-term perspective, YPG wishes to improve the performance of the port, increase the throughput, increase the number of businesses, the project would generate more taxes (for its authority identify) and more GDP.

Thirdly, as YPG is state-owned company, it wishes to be more eco-friendly, the project would promote the transport infrastructure, the project would reduce energy consumption and bring more working opportunities.

#### **● Objectives of HP**

Objectives of HP come from the interview with senior manager of the CSSC. The interview is taken in Chinese while the English version record is present at Appendix 2.

HP's objectives are mainly about its short-term economic objectives: lower cost, higher revenue, increasing profit and higher throughput of the port.

Besides, from a relatively long-term perspective, they wish to have a positive image, which is to be more eco-friendly, offer more working opportunities and have more inter-cultural communication.

Objectives	SEE's Objectives Result (No. of respondents (%))	Is an objective (+1)	Isn't an objective (0)	Weighted Average
Economic Objectives	less tax	6(10.91%)	49(89.09%)	0.11
	more GDP	2(3.64%)	53(96.36%)	0.04
	lower cost	42(76.36%)	13(23.64%)	0.76
	higher revenue	48(87.27%)	7(12.73%)	0.87
	higher profit	48(87.27%)	7(12.73%)	0.87
	increase the throughput of the port	7(12.73%)	48(87.27%)	0.13
	better transport infrastructure	6(10.91%)	49(89.09%)	0.11
	more business opportunity	46(83.64%)	9(16.36%)	0.84
	more land for industry	5(9.09%)	50(90.91%)	0.09
Environmental Objectives	better air quality	10(18.18%)	45(81.82%)	0.18
	better water quality	6(10.91%)	49(89.09%)	0.11
	more eco-friendly	6(10.91%)	49(89.09%)	0.11
	less noise	11(20%)	44(80%)	0.2
	less garbage	12(21.82%)	43(78.18%)	0.22
	less energy consumption	46(83.64%)	9(16.36%)	0.84
	a more beautiful natural landscape	13(23.64%)	42(76.36%)	0.24
Social Objectives	better welfare	14(25.45%)	41(74.55%)	0.25
	better public security	9(16.36%)	46(83.64%)	0.16
	higher employment	44(80%)	11(20%)	0.8
	higher cultural diversity	13(23.64%)	42(76.36%)	0.24

### ● Objectives of SEE

SEE's objectives come from the questionnaires of SEE.

SEE's objectives are: lower cost, more revenue and higher profit of their own business which is related to the project. In addition, they wish to the project could bring increasing number of businesses, higher employment but with less energy consumption.

Table 5.2 Questionnaire 3-1 Output of Self Employed Entrepreneurs' Objectives

### ● Objectives of PL

PL's objectives come from the questionnaires of PL.

PL's objectives are: higher income/salary, more working opportunities, better welfare, better public security and better air quality, water quality, more eco-friendly, less noise and less garbage.

Table 5.3 Questionnaire 3-1 Output of Port laborers' Objectives

Objectives	PL's Objectives Result (No. of respondents (%))	Is an objective (+1)	Isn't an objective (0)	Weighted Average
------------	---	----------------------	------------------------	------------------

Economic Objectives	less tax	35(33.02%)	71(66.98%)	0.33
	more GDP	21(19.81%)	85(80.19%)	0.2
	lower cost	27(25.47%)	79(74.53%)	0.25
	higher revenue	74(69.81%)	32(30.19%)	0.7
	higher profit	40(37.74%)	66(62.26%)	0.38
	increase the throughput of the port	40(37.74%)	66(62.26%)	0.38
	better transport infrastructure	40(37.74%)	66(62.26%)	0.38
	more business opportunity	32(30.19%)	74(69.81%)	0.3
	more land for industry	39(36.79%)	67(63.21%)	0.37
Environmental Objectives	better air quality	72(67.92%)	34(32.08%)	0.68
	better water quality	72(67.92%)	34(32.08%)	0.68
	more eco-friendly	83(78.3%)	23(21.7%)	0.78
	less noise	75(70.75%)	31(29.25%)	0.71
	less garbage	76(71.7%)	30(28.3%)	0.72
	less energy consumption	30(28.3%)	76(71.7%)	0.28
	a more beautiful natural landscape	29(27.36%)	77(72.64%)	0.27
Social Objectives	better welfare	76(71.7%)	30(28.3%)	0.72
	better public security	66(62.26%)	40(37.74%)	0.62
	higher employment	76(71.7%)	30(28.3%)	0.72
	higher cultural diversity	23(21.7%)	83(78.3%)	0.22

### ● Objectives of citizens

Citizens' objectives come from the questionnaires too.

Their objectives are: increasing number of businesses, better air quality, water quality, more eco-friendly, less noise and less garbage. Besides, they wish the port to have a more beautiful natural landscape and better welfare, public security and more working opportunities.

Table 5.4 Questionnaire 3-1 Output of Citizens' Objectives

Objectives	Citizens' Objectives Result (No. of respondents (%))	Is an objective (+1)	Isn't an objective (0)	Weighted Average
Economic Objectives	less tax	40(38.1%)	65(61.9%)	0.38
	more GDP	32(30.48%)	73(69.52%)	0.3
	lower cost	32(30.48%)	73(69.52%)	0.3
	higher revenue	43(40.95%)	62(59.05%)	0.41
	higher profit	39(37.14%)	66(62.86%)	0.37
	increase the throughput of the port	47(44.76%)	58(55.24%)	0.45
	better transport infrastructure	41(39.05%)	64(60.95%)	0.39
	more business opportunity	72(68.57%)	33(31.43%)	0.69
	more land for industry	45(42.86%)	60(57.14%)	0.43
Environmental Objectives	better air quality	69(65.71%)	36(34.29%)	0.66
	better water quality	64(60.95%)	41(39.05%)	0.61

	more eco-friendly	68(64.76%)	37(35.24%)	0.65
	less noise	71(67.62%)	34(32.38%)	0.68
	less garbage	73(69.52%)	32(30.48%)	0.7
	less energy consumption	37(35.24%)	68(64.76%)	0.35
	a more beautiful natural landscape	34(32.38%)	71(67.62%)	0.32
Social Objectives	better welfare	83(79.05%)	22(20.95%)	0.79
	better public security	73(69.52%)	32(30.48%)	0.7
	higher employment	78(74.29%)	27(25.71%)	0.74
	higher cultural diversity	23(21.9%)	82(78.1%)	0.22

### 5.1.3 Resources of stakeholders

By making a stakeholder analysis, stakeholder's attributes such as objectives, resources and position in decision making process are discussed. Among which, resource is one of the most important attributes because normally stakeholders are willing to invest resources of various kinds in the hope of a future return in the form of decisions they favor (Varvasovszky, Z., & Brugha, R., 2000).

In this study, referencing Dr Martin de Jong's literature "*Seeing the People's Republic of China through the Eyes of Montesquieu: Why Sino-European Collaboration on Eco City Development Suffers from European Misinterpretations of 'Good Governance'*", the resources are divided into four kinds in this case: Administrative resource, Resource of implementation, Resource of being Consulted and Resource of public comments.

In the literature, Dr de Jong proposes a "Sextas Politica" in replace of the "Trias Politica". These six powers or resources could exert impacts on policy making. They are legislative power, executive power, judiciary power, implemented power, consultative power and commentative power. In this research, as YPG is a state-owned company while also represents the authority. After all, YPG is nor a governmental institution, therefore, the first three resources is merged into one resource: administrative resource, which is more appropriate.

#### (1) Administrative resource

The administrative resource is the resource mentioned in the literature "*Seeing the People's Republic of China through the Eyes of Montesquieu: Why Sino-European Collaboration on Eco City Development Suffers from European Misinterpretations of 'Good Governance'*", including legislative, executive and judicial power. In this case, administrative resource is only possessed by authority, and decision making is totally relied on the application of this resource (De Jong, M. & H., Stout, 2017). It endows the authority the legitimacy in making policies. It gives the authority the right in making regulations (or laws), judge the violence and execute the regulations. In this



case, YPG is the only representative of the authority. Therefore, YPG possesses administrative resource.

## **(2) Resource of implementation**

Resource in implementation is defined as the resource to implement the project in this case. HP possesses this resource (*Appendix 4*).

Resource of implementation enormously increases HP's influence in terms of project decision making. Because of possessing this resource, HP established a high-efficient communicative channel which could help it exchange information immediately with the decision maker, YPG (*see at 4.1 (4): Yantian Port Group and Hutchison Whampoa signed the joint venture contract of Shenzhen Yantian international container terminal*). The feedback from HP is a significant reference for YPG with respect to making decisions. In this way, HP's subjective feedback is able to reshape the decision maker's mind. Besides, this resource makes HP be the decision maker at implementation level.

## **(3) Resource of being Consulted**

Resource of being Consulted is defined as the resource which offers expertise in assisting decision making. The main body who possesses this resource can be counselors, advisors, experts, consultants and lobbyists, etc. (*De Jong, M. & H., Stout, 2017*). People who are with consultative resource could influence the decision maker by offering their expertise to the policy makers. HP is a prestigious port construction company

(Source: <https://baike.baidu.com/item/%E5%92%8C%E8%AE%B0%E9%BB%84%E5%9F%94%E6%9C%89%E9%99%90%E5%85%AC%E5%8F%B8/2139735?fromtitle=%E5%92%8C%E8%AE%B0%E9%BB%84%E5%9F%94&fromid=3477368&fr=aladdin>).

Besides, some Self Employed Entrepreneurs also possess this resource.

## **(4) Resource of public comments**

The main bodies of the Resource of public comments are mostly social medias or public figures (*De Jong, M. & H., Stout, 2017*). With the wide usage of social networking APPs, people have channels to express their opinions on public. These voices could influence or reshape the comment climate. In these cases, all stakeholders have this kind of resource.

# **5.1.4 Stakeholder's roles in decision making**

## **(1) Decision making process in Shenzhen Yantian port**

In this research, phase model is applied in understanding and describing the decision-making process in Shenzhen Yantian port (*Mintzberg, H., Raisinghani, D.,*

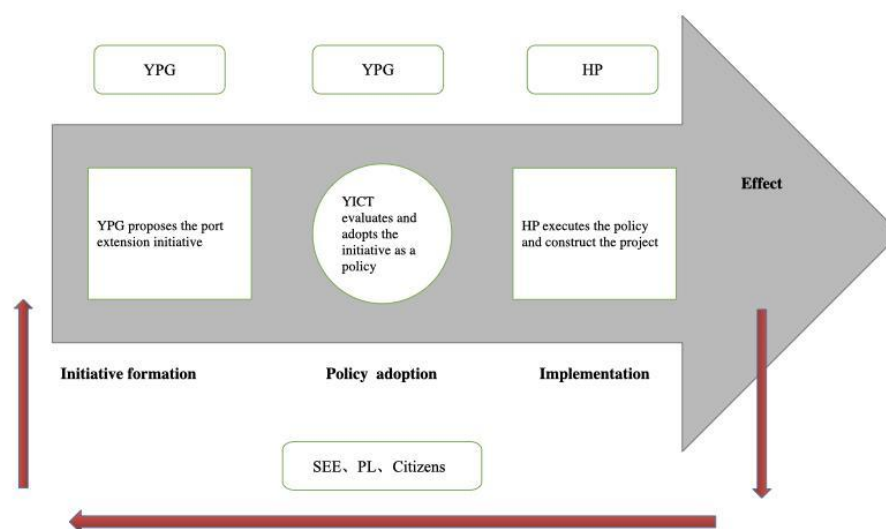
& Theoret, A., 1976). In combination with the interview of YPG (*Appendix 1*) and the materials in terms of illustrating policy making process of this project (*Appendix 4*) as well as the phase model, the policy making process in Yantian can be described as Figure 5-5.

In Yantian port, the initial policy is proposed by YPG at Initiative phase. In this phase, YPG is the only participant.

After this phase, YPG, who represents the Shenzhen Yantian port authority, is the decision-maker, who decides whether or not to adopt the policy, "To extend Yantian port". At this stage, some feasibility studies are unfolded, such as environmental impact analysis. Once the policy is approved, the process enters the "Implementation" phase.

At this phase, HP is obliged to execute the policy, and implement the project. With the realization of the policy, some impacts which are out of policy-maker's expectation appeared. Other stakeholders' interests suffered losses. Therefore, other stakeholders expressed their voices by different channels. Thus, the policy is required to be re-evaluated.

Figure 5-5 Yantian port phase model



## (2) Stakeholder's role in decision making process

In Yantian port extension project, combined with the phase model and referencing the stakeholders' roles in the book "*stakeholder and Strategy Models*" written by Leon Hermans and Scott Cunningham (Hermans, L. M., & Cunningham, S. W., 2018), there are three typical roles in decision making. They are decision makers, strategy stakeholders and victims.

- Decision makers are those who examine and publish the policies.
- Strategic stakeholders are stakeholders who have explicit objectives and they have the ability to influence the policy making environment and other stakeholders.
- Victims are the individuals and organizations who do not have capability to influence the policy but just accept the effects brought by the policy (*Hermans, L. M., & Cunningham, S. W., 2018*).

- **YPG is the decision maker in this case.**

YPG represents the authority in this case, he is the decision maker. According to the historical development of Yantian Port in Baidu Baike (*Retrieved from <https://baike.baidu.com/item/%E7%9B%90%E7%94%B0%E6%B8%AF/5341810?fr=aladdin>*) Shenzhen Yantian local government signed an agent contract with YPG and entrusted Yantian port to YPG. In accordance with the contract, YPG is fully responsible for the construction and operation of the port. Therefore, YPG is the decision-maker in this case.

- **HP is the strategic stakeholder.**

HP is the executor of the project. HP have long term relationship with YPG (*see the case background information at 4.1*). It has great influence on YPG. Furthermore, HP is the decision maker at execution level. It can decide many execution decisions, which could also exert great influence on policy effects.

- **SEE, PL & Citizens are the victims.**

As for Self Employed Entrepreneurs, Port laborers and citizens, they are compelled to be influenced by the project. They almost do not play any crucial role in policy making processes. In most cases, the policy and the project only bring impacts on them.

### 5.1.5 Interdependencies of stakeholders

The interdependency analysis made in this chapter bases on one assumption:

*All the stakeholders are dedicated to use their resources to defense their interests and achieve their objectives.*

In this sense, all the stakeholders are dedicated stakeholders.

Based on this assumption, the interdependency of the problem owner (YPG) on the other stakeholders are depended on two criteria (*Enserink B. et al, 2010*):

1. Resource dependency of problem owner on the stakeholders (*whether the stakeholder is an influential stakeholders*);
2. The degree to which the interests and objectives between YPG and other

stakeholders are similar (*do they have common objectives?*).

In general, there are four kinds of dependency relationships: Strong Allies, Weak Allies, Potential Blockers and Potential Critics. The description of these four relationships is presented in a table following:

Table. 5.6 Interdependencies categories among stakeholders

	Influential stakeholders	Non-influential stakeholders
<b>Similar/supportive objectives</b>	stakeholders that will probably participate and are potentially strong allies	stakeholders that will probably participate and are potentially weak allies
<b>Conflicting objectives</b>	Potential blockers of certain changes (biting dogs)	Potential critics of certain changes (Barking dogs)

Source from (Enserink B. et al, 2010)

### (1) The necessity of cooperation

For the problem owner, YPG in this case, the answer to the first question (Resource dependency of problem owner on the stakeholders (*whether the stakeholder is an influential stakeholders*)) is to determine whether this party's resources are necessary in terms of solving the problem.

The second question is to estimate the possibility in terms of cooperation with these stakeholders (The degree to which the interests and objectives between YPG and other stakeholders are compatible (do they have common objectives)).

To analyze whether the stakeholder is necessary in solving the problem, we introduce the definition of Influential stakeholder and non-influential stakeholder.

To judge a stakeholder whether he is an influential stakeholder or not depends on the resource dependency of the problem owner on him. The resource dependency is weighed by:

- 1.The importance of the resource;
- 2.The replaceability of the resource.

Table 5.7 Resource dependency

	Limited importance	Great importance
<b>Limited options to replace</b>	Medium dependency	High dependency
<b>Can easily be replaced</b>	Limited dependency	Medium dependency

In general, influential stakeholders are those on whom a problem owner critically

depends for solving his problem (*Enserink B. et al, 2010*). By contrast, if there is limited resource dependency of the problem owner (the stakeholder's resources are neither important in policy making, nor difficult to replace), they are defined as non-influential stakeholders.

According to the mechanism described in terms of policy making in this case (Fig. 5-2), administrative resource and resource in implementation are important resources. These two resources are shown in policy adoption and implementation phase. Other resources which include public comment and being consulted do not show up in the model. Besides, all the stakeholders have resource of giving comments. Other resources are only controlled by single stakeholder.

Therefore, the resource dependency is:

Table. 5.8 Resource dependency clarification

	Limited importance	Great importance
Limited options to replace	Resource of being consulted (Medium dependency)	Administrative resource and resource of implementation (High dependency)
Can easily be replaced	Resource of Public Comments (Limited dependency)	No (Medium dependency)

In this way, and combined with the four categories resource dependency, it is clear that:

HP is an influential stakeholder, as he possesses resource of implementation and resource of being consulted, these resources have high or medium dependency.

PL and Citizens are non-influential stakeholders, as their resources only have limited dependency.

As SEE represents a group of Self Employed Entrepreneurs, some of them have resource of being consulted, however, most of them do not have this kind of resource, therefore, in this analysis, this study still takes SEE as non-influential stakeholder.

Therefore,

- 1.YPG have high dependency on HP (influential stakeholder);
- 2.YPG have limited dependency on SEE, PL and Citizens (non-influential stakeholder).

## (2) The possibility in terms of cooperation

In stakeholders' interests and objectives section, the objectives between YPG and other stakeholders are listed. The possibility of cooperation is determined by the compatibility of their objectives. When they have the same objectives, the potential of cooperation is much bigger, on the other way, much smaller.

Table. 5.9 Similarity of objectives with YPG

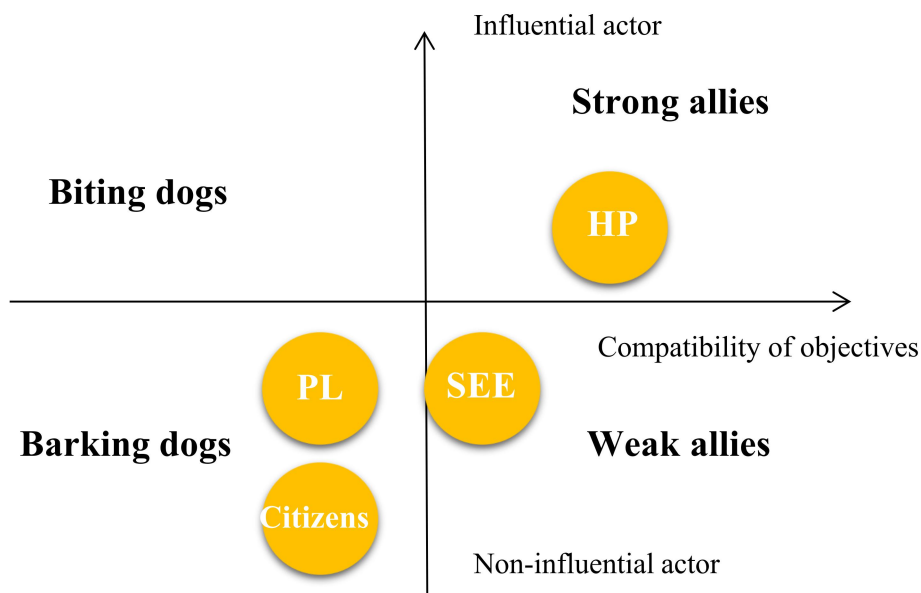
No.	YPG's objective	Other stakeholders are compatible
1	lower cost of the project	HP/SEE
2	higher revenue of the project	HP/SEE/LL
3	increasing profit of the project	HP/SEE
4	increase the throughput	HP
5	increasing number of businesses	HP/SEE/Citizen
6	more taxes generated by the project	/
7	more GDP generated by the project	/
8	better transport infrastructure	HP/PL/Citizen
9	offer more working opportunities	SEE
10	more eco-friendly	HP/PL/Citizen
11	less energy consumption	/

Over half of objectives of YPG are compatible with HP's, and almost half of objectives of YPG are compatible with SEE; only few of objectives of YPG are compatible with LL and citizens.

### (3) The interdependency of YPG

In this way, referencing the stakeholders' interdependency table mentioned above, YPG's dependency on other stakeholders are:

Figure. 5-10 Interdependencies categories among stakeholders



### 5.1.6 Result of stakeholder analysis

Answers to the specific questions:

- *Who are stakeholders involved in this case?*
  - *What are their objectives?*
  - *What are their resources?*
  - *What are their positions in decision making process?*
  - *What is their interdependency between them and the problem owner?*
- are presented below:

Table 5.11 Result of stakeholder analysis

Stakeholder	Objectives	Resource of stakeholders	Position in decision making process	Interdependencies categories
YPG	<ul style="list-style-type: none"> <li>● lower cost of the project</li> <li>● higher revenue of the project</li> <li>● increasing profit of the project</li> <li>● increase the throughput</li> <li>● increasing number of businesses</li> <li>● more taxes generated by the project</li> <li>● more GDP generated by the project</li> <li>● better transport infrastructure</li> <li>● offer more working opportunities</li> <li>● more eco-friendly</li> <li>● less energy consumption</li> </ul>	Administrative resource	Decision maker	/
HP	<ul style="list-style-type: none"> <li>● lower cost of the project</li> <li>● higher revenue of the project</li> <li>● increasing profit of the project</li> <li>● increase the throughput</li> <li>● provide more working opportunities</li> </ul>	Resource of implementation and Resource of being consulted	Strategic stakeholder	Strong ally

	<ul style="list-style-type: none"> <li>● have more inter-cultural communication</li> <li>● more eco-friendly</li> </ul>			
SEE	<ul style="list-style-type: none"> <li>● lower cost of business</li> <li>● more revenue of business</li> <li>● higher profit of business</li> <li>● increasing number of businesses</li> <li>● offer more working opportunities</li> <li>● less energy consumption.</li> </ul>	Resource of public Comments	Victims	Weak ally
PL	<b>Economically:</b> <ul style="list-style-type: none"> <li>● higher income/salary</li> <li>● more working opportunities</li> </ul> <b>Socially:</b> <ul style="list-style-type: none"> <li>● better welfare</li> <li>● better public security</li> </ul> <b>Environmentally:</b> <ul style="list-style-type: none"> <li>● better air quality</li> <li>● better water quality</li> <li>● less noises</li> <li>● less garbage</li> </ul>	Resource of public Comments	Victims	Barking dog
Citizens	<ul style="list-style-type: none"> <li>● increasing number of businesses</li> <li>● better welfare</li> <li>● better public security</li> <li>● offer more working opportunities</li> <li>● better air quality</li> <li>● better water quality</li> <li>● more eco-friendly</li> <li>● less noise</li> <li>● less garbage</li> <li>● a more beautiful natural landscape</li> </ul>	Resource of public Comments	Victims	Barking dog

In combination with the purpose of the stakeholder analysis (mentioned at 2.4.1), the purpose of the analysis is targeting at reaching the first objective of the study:

**"To accurately describe and analyze what happened in this project",** specifically,  
*"Who are influenced by this project?"*

As well as judging

**"Whether Shenzhen Yantian port has realized responsible innovation"**

based on the criterion

*"Did all the critical stakeholders come into problem owner's sight?"*

therefore, the answers are following:

### **(1) Who are influenced by this project?**

HP, SEE, PL and citizens are influenced by this project. The problem owner is YPG. And HP, SEE (self employed entrepreneur), PL (Local labor) and Citizens are the stakeholders who have collectively shaped the current situation in this project.

### **(2) Whether Shenzhen Yantian port has realized responsible innovation?**



According to the criterion "*Did all the critical stakeholders come into problem owner's sight?*", HP and citizens have come into the problem owner's (YPG) sight, SEE and PL though have not come into the problem owner's sight.

In *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), YPG and HP are shareholders of the operating company and shall take responsibility in solving environmental and social problems. Citizens are taken care of especially when they are faced with influences in daily life. But self employed entrepreneurs and Port laborers are ignored and not mentioned in finishing the project. Thus, Shenzhen Yantian Port hasn't realized responsible innovation.

### **5.1.7 Summary of analysis**

In this section, stakeholder analysis is made surrounding the specific questions:

- *Who are stakeholders involved in this case?*
- *What are their objectives?*
- *What are their resources?*
- *What are their positions in decision making process?*
- *What is their interdependency between them and the problem owner?*

Referencing the framework of stakeholder analysis made in Nansha port and Yangshan port (Ravesteijn, W., & He, J. et al., 2014; Song, L & Ravesteijn, W, 2015), in combination with the information acquired by interview with YPG and CSSC (HP), questionnaires with SEE, LL and citizens, specific questions are answered and a vivid picture of each stakeholder is shown in front of us.

In Shenzhen Yantian port, objectives of stakeholders are diverging, some of their objectives even conflicting. Besides, some stakeholders have resources and play important roles in decision making; some do not have influential resource and crucial positions in decision making, which led to the neglect of the problem owner when making the decision, implementing the project. In this way, responsible innovation has not realized in this project.

In the next section, impact assessment is going to make revolving around the stakeholders analyzed in this section.

## 5.2 Impact assessment

The second analysis is the impact assessment. Economic, environmental and social impacts on each stakeholder are explained as first level impact indicators based on relative literatures and results of the interviews and questionnaires.

Environmental Impact Assessment (EIA) was firstly introduced for decision making and Strategic Environmental Assessment (SEA) evolved on program strategic level. For sustainability assessment, social and economic issues are recently more frequently regarded with environmental ones in impact assessment processes (*Morrison-Saunders, A., & Fischer, T. B., 2010*). Some methods of EIA also consider economic and social objectives to assess more completely about the sustainability of the underlying studying question (*Payrau De Au, S., & Werf, H., 2005*).

For this special case of Shenzhen Yantian Port Project, economic, environmental and social impacts are taken into account to assess the comprehensive impacts.

### 5.2.1 Impacts brought by the project

According to *Yantian Port Group's 2020 Social Responsibility Report*, based on Shenzhen Port, Yantian Port closely follows China national strategies such as the coordinated development of Guangdong-Hong Kong-Macao Greater Bay Area, the Beijing-Tianjin-Hebei region, and the Yangtze River Economic Belt, and connects with the vast economic hinterland of the mainland through the river-sea interconnection, paving the way for a new pattern of "big circular" economy. Yantian Port actively explores the international market, and helps smooth the domestic cycle and the domestic and international dual cycles. Moreover, it takes comprehensive digital transformation as the main means to improve port business, accelerate business upgrades, cultivate new drivers of development, implement capital operations, promote the integrated development of "port-industry-city", and bravely become the main force and new force in Shenzhen's construction of a global ocean center city (*Yantian Port Group's 2020 Social Responsibility Report. (n.d.)*, Retrieved from <http://www.ytport.com/jtgk/jtshzrbg/202106/P020210629655975730356.pdf>).

YPG is able to legally construct and operate Yantian port. Since then, a huge growth in terms of throughput and profits were witnessed. According to *Yantian Port (000088.SZ) 2018, 2019 and 2020 annual reports* (Retrieved from Wind database), Loading & Unloading and transportation revenues of Yantian Port from 2018 to 2020 are 125, 315, 316 million RMB, with a compound annual growth rate of about 59%.

respectively. According to *Yantian Port (000088.SZ) management analysis of 2020 annual report*, in 2020, Yantian Port Group completed the container throughput of 147.763 TEU, of which Shenzhen region completed the throughput of 147.74 million TEU, accounting for 55.41% of the Shenzhen Port market. Furthermore, HP is a diversified company which keeps expanding its size of business. HP has stabilized its status as an international giant whose businesses cover logistics, construction, transportation and services, etc.

On the other hand, benefiting from a boomer port economy, Chinese government has shown its heating willingness in cooperating with HP. As a result, Yantian Port has lifted its position in global trade. HP wishes to make Yantian Port become increasingly profitable and play an irreplaceable role in this region. The goal is to expanding the business size of Yantian Port Container Terminal to meet the growing container throughput of Yantian Port Area and enhance HP and YPG's competitive position in Yantian Port in the world container port industry (*Yantian Port's 10.9 billion terminal project has shown up, which is the world's smartest port area (n.d.)*, Retrieved from Gangkouquan, <https://www.163.com/dy/article/GC9GQ6VK0519CUIJ.html>). To achieve the objectives, large number of investments on updated technologies and innovations are planned to be used on this project. According to Sun Bo, Chairman of Shenzhen Yantian Port Group, Yantian Port as the only sea-related large-scale enterprise group in Shenzhen City, will integrate into the construction to promote the intelligence port. Intelligent laboratory and 5G smart port area construction have vigorously promoted the fourth-generation port construction and accelerated the world's first 200,000-ton fully automated terminal construction in Yantian Port Area, and helped Shenzhen Constructed an International Shipping Center (*Yantian Port will build the world's first 200,000 ton fully automated terminal (n.d.)*. Retrieved from Gangkouquan, <https://www.cnss.com.cn/html/gkdt/20191018/332122.html>). Although the automated terminal investment is large, it can significantly reduce the operating costs. As the operating information system continuously improves, the advantages of the automated terminal will be fully utilized. These technologies and innovations have brought impacts to the local economy, society and environment.

Economic, environmental and social impacts are brought to the stakeholders. To objectively assess the impacts brought by the project on each stakeholder, we make an impact assessment.

Since large project is of great size and occupies resources, some of the impacts are shown during the construction period, but some are gradually arising in a long period of operation time. For instance, construction waste is discharged during the construction, however, economic benefits can be achieved for companies year over year in the long run. Thus, some impacts are assessed for a wider range of time.

To accomplish impact assessment from economic, environmental and social aspects, questionnaires and interviews are designed to assess impacts on basis of literatures. The construction of the framework of port expansion project's Impact Assessment Indicator System is mainly divided into the following steps (*Wang, C., 2020*):

- Firstly, screen preliminary indicators. The indicators of comprehensive impact assessment of different types of projects are referred and summarized according to existing literatures for building the impact assessment indicator system of port expansion project.
- Secondly, delete and supplement indicators by questionnaires. On the one hand, the indicators of other types of projects and port expansion projects are compared to the need for the impact assessment; on the other hand, experts in the field of port expansion projects put forward the indicators that have not been mentioned in existing literatures.
- Thirdly, construct a comprehensive port expansion impact assessment indicator system through summing up similar ones. Some modifications are made.

When performing literature screening, from the retrieved literature (*Xing G., 1994; Chen W., 2006; Yang, Q., & Zhang Z., 2006; Jia, G & Yang, F. et al., 2010*), most of them includes first level indicators about economic, environmental, social impacts.

After continuous analysis and summarization in combination of literatures and opinions from experts and questionnaires, this paper finalizes the second level indicator impact assessment for port expansion projects as following:

**Economic Impacts:** A better port economy, Increasing throughput of the port, A Better logistic system, more fiscal income, Property loss due to the project.

**Environmental Impacts:** Construction waste, Water pollution, Natural ecosystem and landscape is destroyed, Air pollution, Noise pollution.

**Social Impacts:** Social issues related to employment rate, social issues related to pollution, social issues related to restriction to natural resources, social issues related to polarization between the poor and the rich, social issues related to destruction of public security.

Later on, this paper analyzes each second level impact under framework of first level impact. The levels of impacts for each stakeholder are explained and the result outputs are shown at the end of each part.

## 5.2.2 Economic impact assessment

According to the company and business introduction part in "21 Yantian Port 03: Bond Offering Prospectus for Yantian Port Group (Stage II) in 2021" (*Retrieved from Wind database*), Yantian Port is divided into Middle, East, West operation area, Middle area has already been built, and East area is under tight construction. Now this port has 20 large deep-water berths. The shore wire is 8212 meters long and the depth of water is 17.6 meters. The port is the prior choice for the world's largest 20,000-ton super-large ships. Among them, three berths of Middle area Phase I and Phase II projects are 100,000 tons, and two berths of which are 70,000 tons. They are held by YICT, in which YPG and HP, holds 29% and 71% shares respectively. Three berths of West area are 50,000 tons and the other three are 70,000 tons. The operational company is Westport Terminal Company, in which YPG and HP, holds 35% and 65% shares respectively. 4 berths for Middle area Phase III project are 150,000 tons, the expansion project is consisted of 5 berths with 200,000 tons and 1 berth with 150,000 tons. The operator is Yantian Phase III company, in which YPG and HP, holds 35% and 65% shares respectively.

The Bond Offering Prospectus also includes some concrete numbers. Yantian Port is a hub-shaped port area mainly based in South China. There are nearly 100 ship routes per week, 60% of which are related to Europe and United States. It has large monomer throughput and is a very profitable and leading global container terminal. In recent years, the container throughput of Yantian Port is rising steadily. In the future, the container throughput of Yantian Port Area will further improve with the accomplishment of East area production capacity. At present, YPG and HP work in cooperation in YICT, Yantian Phase III Company and Westport Terminal Company. That cooperation has become important sources for YPG and company profits.

### (1) A better port economy

For YPG, it has achieved great success and economic benefits from these successful large-scale projects cooperated by the government and enterprises. Yantian Port Group was established in 1985, with a registered capital of only 800,000 RMB at the beginning. It started with port construction and operated in debt. So far it has a registered capital of 4.53 billion RMB and targets at port investment, integrated logistics and other services (*Retrieved from <https://www.qcc.com/crun/9b5cb0034186e0370459a6b4ee351d80.html>*). Three main business are defined by this comprehensive enterprise group. For YICT and other construction and operation companies of the port, they are considered as subsidiaries of Yantian Port Group. A better economy is regarded as YPG's achievement in public eyes. This works for its objective "A better port economy". In addition, it will bring

continuous income and investment. According to the company and business introduction part in "21 Yantian Port 03: Bond Offering Prospectus for Yantian Port Group (Stage II) in 2021" (*Retrieved from Wind database*), in recent years, the investment incomes under the Equity method in Yantian Port Area of YPG are 1016, 1067, 992 million RMB. In this way, YPG directly and substantially benefit from this.

For HP, as the shareholder of the port, a better economy will directly generate higher reward for its investment (*Retrieved from <https://max.book118.com/html/2011/0810/452180.shtm>*). The cooperation between Hutchison Whampoa and Yantian Port started from the first and second phase projects. For the subsequent projects, HP has acquired large shares of the first, second, third and the third expansion phase projects, and has taken the lead in the future expansion plan of the eastern port area of Yantian Port.

With the improvement of Yantian Port Area Phase III Project, the annual throughput capacity is 2 million TEUs, and the acceptance quality of the project is always rated as excellent. After it is put into production, the throughput capacity has exceeded 2.8 million TEUs, and the economic benefits are significant (*Shenzhen Port, 2009*). In no doubt, the Phase III extension project could make a difference for the economy.

As Yantian Port becomes more prosperous, the cooperation between HP and Chinese enterprises will get promoted. Besides, Yantian Port's success could be an example of win-win deal with Yantian Port Group which would be used in HP's future business expansion worldwide. In this sense, HP directly and substantially benefit from this.

## **(2) Increasing throughput of the port**

For YPG, the increase of throughput directly led to a higher revenue and income. As a 100% state-owned enterprise, YPG's revenue and income directly help fiscal department gain benefit. The government benefits from the increasing revenue. Even after share dilution, YPG lost its inflow revenue(dividend), however, the net income grows steadily over time. According to annual reports of Yantian Port from 2016 to 2020 (*Retrieved from Wind database*), its revenue grows at a CAGR of 13.99%, 21.16%, 17.38%, 47.05%, -10.84% from 2016 to 2020. The financial performance in 2020 is influenced negatively by COVID. In this way, YPG directly and substantially benefit from this impact.

For HP, it benefits from the revenue growth of Yantian Port. As a shareholder of three Phases Projects, HP successfully witnessed revenue, income and cash flows from these projects. However, HP takes part in these projects not only because of growing business, but also for better relationship with port company in mainland China. To sum up, HP benefits from this impact.

### **(3) A better logistic system**

For YPG & self employed entrepreneurs, the construction of Yantian Phase I, II, III and extension projects are going to reduce the transportation fees of the cargoes. It will make Yantian Port more attractive and raise its competitiveness with respect to its role in international trade. The updated technologies and management institutions reduce the operational fees and at the same time raise the working efficiency, which finally will contribute to the lower cost of operational fees. With the completeness of the transportation system, traveling will be more convenient and cheaper. YPG benefits from lower operational fees (*Yantian Port will build the world's first 200,000 ton fully automated terminal (n.d.). Retrieved from Gangkouquan, <https://www.cnss.com.cn/html/gkdt/20191018/332122.html>*). The profit of the port will increase step by step. Self employed entrepreneurs cut their expenses in product transportation. A complete infrastructure would help them to increase their profits. In this sense, the assessment of HP and Self Employed Entrepreneurs are substantial and direct.

### **(4) More income**

For YPG, on the one hand, it has to share profit of the projects with HP. On the other hand, YPG, the ultimate control power of which belongs to Chinese government (*Yantian Port Group. (n.d.). Retrieved from Qichacha Database. <https://www.qcc.com/crun/9b5cb0034186e0370459a6b4ee351d80.html>*), establishes a good international corporate image and helps build a good relationship between HP and Chinese government. YPG will benefit from heating cooperation. Therefore, more income brought both positive and negative impacts to YPG, however, from a long-term perspective, the benefits are overpass the losses. in this sense, YPG benefit from more income.

### **(5) Property loss due to the project**

The port extension project requires project managers to expropriate the land from some local people. Land expropriation forced people who live nearby to leave their places, change their living habits. For YPG, it would not suffer these losses directly. However, because it is a 100% state owned company (*Yantian Port Group. (n.d.). Retrieved from Qichacha Database. <https://www.qcc.com/crun/9b5cb0034186e0370459a6b4ee351d80.html>*), property loss may have side effects on its image.

For self employed entrepreneurs, Port laborers and citizens, impacts are assessed

according to questionnaires and outputs are as following.

Table 5.12 Questionnaire 3-2 Output of Self Employed Entrepreneurs' Economic Impacts

SEE's Economic Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
A better port economy	0(0%)	42(79.25%)	0(0%)	1(1.89%)	2(3.77%)	4(7.55%)	4(7.55%)
Increasing throughput of the port	39(73.58%)	2(3.77%)	3(5.66%)	1(1.89%)	3(5.66%)	1(1.89%)	4(7.55%)
A Better logistic system	39(73.58%)	4(7.55%)	4(7.55%)	2(3.77%)	2(3.77%)	2(3.77%)	0(0%)
More income	2(3.77%)	2(3.77%)	37(69.81%)	2(3.77%)	4(7.55%)	2(3.77%)	4(7.55%)
Property loss due to the project	3(5.66%)	0(0%)	2(3.77%)	3(5.66%)	3(5.66%)	2(3.77%)	40(75.47%)

Table 5.13 Questionnaire 3-2 Output of Port laborers' Economic Impacts

PL's Economic Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
A better port economy	6(5.56%)	2(1.85%)	79(73.15%)	3(2.78%)	2(1.85%)	4(3.7%)	12(11.11%)
Increasing throughput of the port	4(3.7%)	4(3.7%)	92(85.19%)	4(3.7%)	1(0.93%)	2(1.85%)	1(0.93%)
A Better logistic system	2(1.85%)	0(0%)	79(73.15%)	1(0.93%)	5(4.63%)	14(12.96%)	7(6.48%)
More income	6(5.56%)	11(10.19%)	83(76.85%)	6(5.56%)	0(0%)	1(0.93%)	1(0.93%)
Property loss due to the project	4(3.7%)	1(0.93%)	2(1.85%)	2(1.85%)	10(9.26%)	85(78.7%)	4(3.7%)

Table 5.14 Questionnaire 3-2 Output of Citizens' Economic Impacts

Citizens' Economic Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
A better port economy	2(1.89%)	3(2.83%)	82(77.36%)	2(1.89%)	3(2.83%)	6(5.66%)	8(7.55%)
Increasing throughput of the port	3(2.83%)	4(3.77%)	8(7.55%)	3(2.83%)	80(75.47%)	3(2.83%)	5(4.72%)
A Better logistic system	1(0.94%)	5(4.72%)	84(79.25%)	3(2.83%)	3(2.83%)	8(7.55%)	2(1.89%)
More income	3(2.83%)	7(6.6%)	79(74.53%)	3(2.83%)	5(4.72%)	4(3.77%)	5(4.72%)
Property loss due to the project	6(5.66%)	3(2.83%)	4(3.77%)	3(2.83%)	84(79.25%)	4(3.77%)	2(1.89%)



To sum up, Economic impacts assessment result is in the following table. For YPG, it directly and substantially benefits from "A better port economy", "Increasing throughput of the port" and "A Better logistic system". It benefits from "More income". However, it indirectly suffers from "Property loss due to the project". For HP, it directly and substantially benefits from "A better port economy" and "More income". It benefits from "Increasing throughput of the port" and "A Better logistic system". Moreover, it is not influenced by "Property loss due to the project". For Self Employed Entrepreneurs, they directly and substantially benefit from "Increasing throughput of the port" and "A Better logistic system". They benefit from "A better port economy". They indirectly benefit from "More income". However, they directly and substantially suffer from "Property loss due to the project". For Port laborers, they indirectly benefit from "A better port economy", "Increasing throughput of the port", "A Better logistic system" and "More income". They suffer from "Property loss due to the project". For citizens, they indirectly benefit from "A better port economy", "A Better logistic system" and "More income". They indirectly suffer from "Increasing throughput of the port" and "Property loss due to the project".

Table. 5.15 Economic impacts assessment

Impact	YPG	HP	SEE	PL	Citizens
A better port economy	3	3	2	1	1
Increasing throughput of the port	3	2	3	1	-1
A Better logistic system	3	2	3	1	1
More income	2	3	1	1	1
Property loss due to the project	-1	0	-3	-2	-1

### 5.2.3 Environmental impact assessment

As the whole port has become busier and more commercial, the environmental pressure is estimated to be more intensive. However, most of the technologies are updated and HP concerns environmental impacts before installing them, more importantly, the government has environment regulations in terms of monitoring the environment. Therefore, the pollution would not be over unbearable. According to *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), a general conclusion of meeting the planning requirements of "The legal plan of Yantian 02-01 area [land area behind Yantian Port] in Shenzhen" has been reached, and the business content meets the relevant industrial policies.

This paper has an overview of environmental status in Yantian Port area. To start with, firstly water quality is introduced, according to the "Shenzhen Environmental Quality Report", the relevant surface water monitoring indicators can meet the "Surface Water

*Environmental Quality Standard "(GB3 838-2002 standard)* and sea water quality can reach the *"Sea Water Quality Standard "(GB3097-1997) level 3*. It has good water quality.

Secondly, air quality is introduced. According to *"Yantian area environmental air quality evaluation index"* all pollutants, such as SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO and O<sub>3</sub> are monitored and the results are all up to standard, so the air quality of Yantian district is up to standard.

The detailed environment impacts are introduced as following and relative analysis regarding different stakeholders are made.

### **(1) Construction waste**

Implementation of environmental protection measures has been made during construction, however, there are still some environmental impacts from construction.

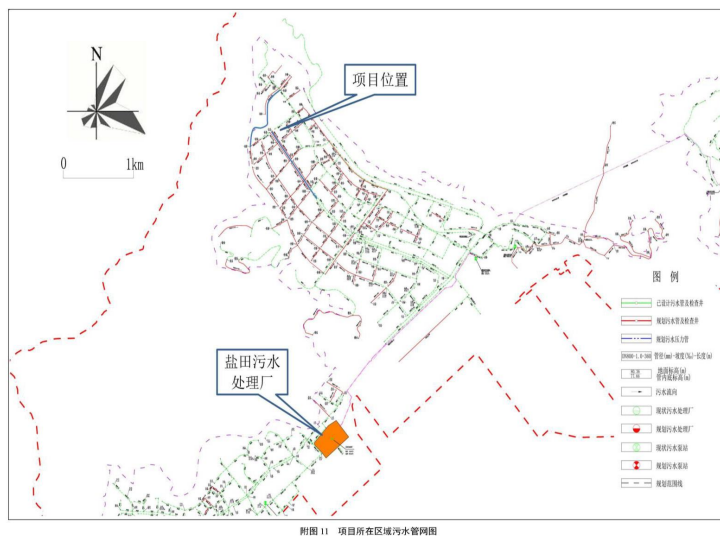
According to *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), 35.8g/s dust is generated on the construction site during the construction of the project in engineering analysis. In accordance with the *Notice of General Office of Shenzhen Municipal People's Government on Printing and Distributing Shenzhen Municipal Air Environment Quality Improvement Plan (Shenzhen Municipal Office)[2013] No.19*, the construction site must be 100% standardized enclosure of the construction site, 10% covering of the site sand when not in use, 100% hardening of the site pavement, 100% washing of the wheel body of the vehicles out of the site, 100% covering or greening of the long-term bare soil on the construction site.

SO<sub>2</sub>, NO<sub>x</sub>, CO, hydrocarbons and other pollutants generated by fuel oil of construction machinery will also have an impact on the atmospheric environment, but the emission of such pollutants is small and intermittent. By selecting construction machines and tools with sufficient combustion, to reduce the exhaust emission of construction machines and timely maintenance to keep the construction machinery in good condition and normal use at any time can the impact of mechanical exhaust on the surrounding environment be reduced.

According to the requirements of the *Notice of General Office of Shenzhen Municipal People's Government on Printing and Distributing Shenzhen Municipal Air Environment Quality Improvement Plan (Shenzhen Municipal Office) [2013] No.19*, the diesel construction machinery installed with regenerative diesel particulate trap must be used for the construction of the project.

Moreover, water and solid wastes from the construction period come directly from Yantian Port extension project. Due to the fact that Yantian District only has limited pollutants managing ability, recycling could be a puzzle for every stakeholder.

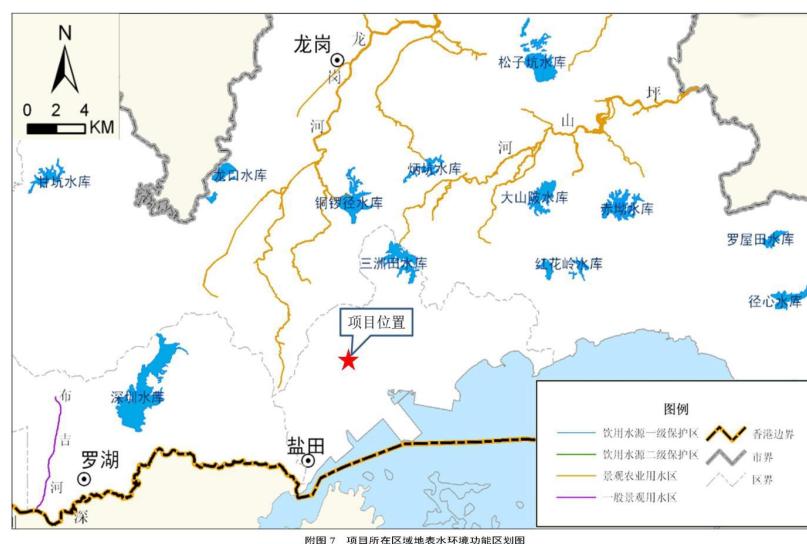
Figure 5.16 Sewage treatment plant within Yantian Port Area



## (2) Water pollution

According to *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), the nearest surface water of the project is Yantian River, which is one of the main rivers in Yantian District, Shenzhen. Yantian River has a total length of 6.4km and a drainage area of the area is 20.85 km<sup>2</sup> and the average width of the river is 25m. In recent years, due to the gradual appearance of the results of Yantian River Regulation Project, Yantian River is the longest river in Yantian District with the most significant changes. All of the 21 evaluation indexes of water quality monitoring of Shuangyong Park section of Yantian River and Yangang middle school section meet the water quality objectives of the water environment functional area.

Figure 5.17 Drinking water source in Yantian District



According to the calculation of Yantian Port water environment forecast, the oily engine room water of fishing boats moored in the fishing port is directly discharged without treatment. The maximum oil concentration of 0.05mg/L in the sewage is within the range of 300-500m outside the fishing port, which will not affect the large and small Meisha beaches on the east side of the fishing port (Zhou, B., & Wang, N., et al, 2006). The water quality could be directly impacted. However, considering that the water area of Dapeng Bay is a red tide-prone area, the water quality of Dameisha is not optimistic. In order to fundamentally avoid the deterioration of the water quality of Dameisha sea area and protect the tourist coastline and beach environment of Dameisha Beach, it needs to be dealt with after reaching the standard centralized emission level.

Moreover, the quality of the surface water is affected by an increase of water turbidity, caused by higher concentrations of mud and sand in the water resulting from the construction of the project. Underground water is polluted by waste water or sewage from the temporary living places of workers and employees.

The wastewater generated during the operation period of the project mainly comes from the domestic sewage of office personnel and warehouse cleaning wastewater. The wastewater from tank treatment and ground cleaning is discharged into the municipal sewage pipe network after being treated in the oil separation and grit chamber, and after treatment by Yantian sewage treatment plant up to the standard, it is allowed to be discharged.

### (3) Natural ecosystem was destroyed and landscape was changed

In the *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from

[http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), for the land usage, land types within the scope of eco-environmental impact assessment of the project include forest land, storage land, residential land, green land, etc. The vegetation in the area of 200m is mainly secondary forest and artificial afforestation. Overall, the project is mostly located in the urban built-up area, and partly in the basic ecological control line. Thus, the ecological environment is greatly affected by human, and ecological environmental quality is below average.

The port extension project needs land expropriation. The lands that are used for the project previously were mainly natural reservation such as grasslands or forests. Also, the port extension project greatly influenced the marine environment. The construction of the project changed this natural reservation into factories, stations or living places.

Moreover, in the *Environmental Protection Acceptance Form of Yantian Port Project Completion Report*, for the land usage, land types within the scope of eco-environmental impact assessment of the project include forest land, storage land, residential land, green land, etc. The vegetation in the area of 200m is mainly secondary forest and artificial afforestation. Overall, the project is mostly located in the urban built-up area, and partly in the basic ecological control line. Thus, the ecological environment is greatly affected by human, and ecological environmental quality is below average. However, according to verification in this report, there is no large-scale water and soil loss during the construction of the project, and the bare ground has been hardened and repaired greened.

#### **(4) Air pollution**

Equipment and machines generate green house or other hazard gas emissions during the project construction process. Increasing inhabitants and vehicles, the use of fossil fuels worsens the air condition.

In the *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), there are two main types of air pollution.

Diesel generator set tail gas: the diesel generator set of the project is not used at ordinary times, but only used for emergency power generation. The pollutants in the gas are mainly soot, SO<sub>2</sub>, NO<sub>x</sub>, Co, hydrocarbons, etc. At present, the power supply in Shenzhen is relatively normal, so the frequency of the use of standby power generation is limited, only in emergency use under special circumstances such as sudden power failure. Since the diesel generator is not often used, and each time, the duration of use is also short, thus, the impact is temporary and has little impact on the

environment.

Garbage station odor: domestic garbage will produce fermentation odor in the process of stacking, so garbage should be removed and transported in time, and the garbage room should be deodorized, and independent exhaust facilities are set up. The exhaust vents are far away from the office area so as to minimize the impact of the odor in the garbage room.

Figure 5.18 Air quality function regions in Shenzhen



附图 9 项目所在区域大气环境功能区划图

## (5) Noise pollution

The sounds come from the equipment used in the course of construction, the trains and the train stations during operation. Increasing ships, inhabitants and vehicles deteriorate the noise pollution.

According to the *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), the noise sources during the project operation period are mainly traffic noise and generator noise. The vehicles in the site generally drive at low speed, and the noise is expected to be about 80dB (a), which has little impact on the environment; The forklift noise in the warehouse is generally 80 ~ 85dB (a), and because it is operated indoors, it has little impact on the external environment; The standby generator of the project is only used in case of power failure. The power supply in this area is normal and electricity rarely fails, so the use of standby generators is very rare. The standby generator shall be placed in the special equipment room and equipped with damping pad.

For Self Employed Entrepreneurs, Port laborers and citizens, impacts are assessed according to questionnaires and outputs are as following.

Table 5.19 Questionnaire 3-2 Output of Self Employed Entrepreneurs' Environmental Impacts

SEE's Environmental Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
Construction waste	2(3.77%)	3(5.66%)	0(0%)	4(7.55%)	4(7.55%)	38(71.7%)	2(3.77%)
Water pollution	4(7.55%)	3(5.66%)	2(3.77%)	3(5.66%)	34(64.15%)	1(1.89%)	6(11.32%)
Natural ecosystem and landscape are destroyed	1(1.89%)	3(5.66%)	5(9.43%)	36(67.92%)	1(1.89%)	5(9.43%)	2(3.77%)
Air pollution	2(3.77%)	3(5.66%)	3(5.66%)	3(5.66%)	36(67.92%)	3(5.66%)	3(5.66%)
Noise pollution	4(7.55%)	3(5.66%)	3(5.66%)	34(64.15%)	2(3.77%)	4(7.55%)	3(5.66%)

Table 5.20 Questionnaire 3-2 Output of Port laborers' Environmental Impacts

PL's Environmental Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
Construction waste	4(3.7%)	5(4.63%)	4(3.7%)	10(9.26%)	69(63.89%)	12(11.11%)	4(3.7%)
Water pollution	5(4.63%)	9(8.33%)	7(6.48%)	4(3.7%)	5(4.63%)	7(6.48%)	71(65.74%)
Natural ecosystem and landscape are destroyed	6(5.56%)	5(4.63%)	10(9.26%)	7(6.48%)	70(64.81%)	8(7.41%)	2(1.85%)
Air pollution	11(10.19%)	11(10.19%)	3(2.78%)	3(2.78%)	4(3.7%)	8(7.41%)	68(62.96%)
Noise pollution	10(9.26%)	5(4.63%)	6(5.56%)	9(8.33%)	3(2.78%)	8(7.41%)	67(62.04%)

Table 5.21 Questionnaire 3-2 Output of Citizens' Environmental Impacts

Citizens' Environmental Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
Construction waste	4(3.77%)	9(8.49%)	9(8.49%)	5(4.72%)	3(2.83%)	71(66.98%)	5(4.72%)
Water pollution	3(2.83%)	7(6.6%)	5(4.72%)	5(4.72%)	8(7.55%)	7(6.6%)	71(66.98%)
Natural ecosystem and landscape are destroyed	7(6.6%)	7(6.6%)	7(6.6%)	3(2.83%)	8(7.55%)	69(65.09%)	5(4.72%)
Air pollution	8(7.55%)	7(6.6%)	5(4.72%)	9(8.49%)	4(3.77%)	4(3.77%)	69(65.09%)
Noise pollution	9(8.49%)	3(2.83%)	4(3.77%)	5(4.72%)	3(2.83%)	8(7.55%)	74(69.81%)

For different stakeholders, analyses are as following.

Protecting environment is authority's responsibility. For YPG, as a state-owned enterprise, when public gets increasing attention about the environment, would pay



increasing effort and money in improving its governance in terms of environment protection and pollution prevention. In the *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), the enterprises involved in the project are required to spend money and use technology to solve the environmental approval before starting the project. However, YPG, as the shareholder of the port builder, wants to accomplish the construction and smoothly operate the projects. Thus, pollution prevention means more cost. Saving cost and earn revenue is YPG's goal, concerning all these above, different types of pollution, assessments of "Construction waste", "Water pollution", "Air pollution", "Natural ecosystem and landscape is destroyed", "Noise pollution" are of slight positive impacts.

Figure 5-22 Yantian Port Phase I, II, III and Extension Projects



In this particular case, HP is one of the project executors, HP is regarded as one of the directors responsible for the pollution related to the project. In the *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), as one of the shareholders of the operating company involved in the project, it should also try to solve the environmental problems before starting the project. However, for HP itself, these environmental impacts do not bring any positive or negative feeling. On the contrary, lower environmental regulatory standards would reduce the cost of construction and port operation. By contrast, to install environmental protection equipment or pay increasing resources in daily construction would cause extra fees. Therefore, HP has a strong motivation in terms of maintaining the situation, any change of these environmental impacts will directly influence its costs and profits, therefore, the assessment is positive benefit.

To sum up, Environmental impacts assessment result is in the following table. For



YPG, it indirectly benefits from "Construction waste", "Water pollution", "Natural ecosystem and landscape is destroyed", "Air pollution" and "Noise pollution". For HP, it benefits from "Construction waste", "Water pollution", "Natural ecosystem and landscape is destroyed", "Air pollution" and "Noise pollution". For Self Employed Entrepreneurs, they suffer from "Construction waste". They indirectly suffer from "Water pollution" and "Air pollution". Moreover, they are not influenced by "Natural ecosystem and landscape is destroyed" and "Noise pollution". For Port laborers, they directly and substantially suffer from "Water pollution", "Air pollution" and "Noise pollution". They indirectly suffer from "Construction waste" and "Natural ecosystem and landscape is destroyed". For Citizens, they directly and substantially suffer from "Water pollution", "Air pollution" and "Noise pollution". They suffer from indirectly suffer from "Construction waste" and "Natural ecosystem and landscape is destroyed".

Table. 5.23 Environmental impacts assessment

Impact	YPG	HP	SEE	PL	Citizens
Construction waste	1	2	-2	-1	-2
Water pollution	1	2	-1	-3	-3
Natural ecosystem and landscape are destroyed	1	2	0	-1	-2
Air pollution	1	2	-1	-3	-3
Noise pollution	1	2	0	-3	-3

## 5.2.4 Social impact assessment

According to *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), after corresponding measures made to dispose exhaust gas, noise, etc. produced during construction, the social impact could be smaller.

For the extension project, Social Stability Risk Analysis is announced for public participation. People could take parts in evaluating the social impacts of Yantian Port East Area Container Terminal Project (*Yantian Port East Area Container Terminal Phase I Project, Social Stability Risk Analysis asks for Public Participation*, Retrieved from [www.ytport.com/tzgg/201910/t20191012\\_6827.html](http://www.ytport.com/tzgg/201910/t20191012_6827.html)).

In this section, detailed social impacts are introduced as following and relative analysis regarding different stakeholders are made.

### (1) Social issues related to employment rate

Yantian Port Phase I, II, III and extension project consumed a huge number of local

employments. According to 2021 annual report of Yantian Port (*Retrieved from Wind database*), Yantian Port created 848 working opportunities to the local communities and indirectly working opportunities are unaccountable. In general, a higher employment rate means the equilibration of the labor market moves towards the labor side, in other words, laborers are at a relatively positive position while the hiring companies are relatively weak.

## **(2) Social issues related to pollution**

Environmental pollution intensifies people's dissatisfaction. People may suffer when their living environment was getting increasingly polluted and choose to leave, which in turn has an impact on population movement (*Xing, G., 1994*).

According to introduction of Port pollution prevention in Baidu Baike (*Retrieved from <https://baike.baidu.com/item/%E6%B8%AF%E5%8F%A3%E6%B1%A1%E6%9F%93%E9%98%B2%E6%B2%BB/3368150?fr=aladdin>*), port water pollution mainly causes the following manifestations: Petroleum is the main pollutant in port waters. Oil pollution is particularly harmful to inland river ports that also serve as drinking water sources. The benzo(a)pyrene contained in oil is a strong carcinogen. The washing water of ships carrying toxic chemicals can directly kill aquatic organisms and poison people. Domestic sewage discharged from ships, such as toilet flushing, is discharged into the port, which can infect many diseases. The domestic garbage discharged from ships contains organic matter and germs; some of the cleared garbage contains toxic substances, such as pesticides. Dust spilled during loading and unloading can reduce the transparency of water, and toxic dust can directly kill aquatic organisms.

Air pollution in the port is mainly caused by dust and waste gas. Dusts such as yellow sand, coal, and mineral sands can cause people to suffer from silicosis; dusts such as pesticides and fertilizers can poison people; grain and cotton dust in the air reach a certain concentration and can explode in fire. The waste gas emitted by ships and kilns in the port area contains carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>) and hydrocarbons. Especially when loading and unloading oil, a large amount of hydrocarbons volatilize into the atmosphere, which will harm human health. Such as causing fatigue, dizziness, headache, nausea and vomiting, palpitation and wheezing, blood changes, etc.

People suffer from worse health condition and leave, which in turn would affect the collective interests of local residents and news about the public interests could cause bad social reactions.

## **(3) Social issues related to restriction in using natural resources**

According to *Yantian overall relocation project helps 1344 owners to relocate and open the door of happiness* (Retrieved from [https://www.sohu.com/a/441490039\\_161795](https://www.sohu.com/a/441490039_161795)), in March 2005, the Municipal Party Committee and the Municipal Government implemented the development strategy of "strengthening the city by port" and "linking the district and the port", and decided to relocate Yantian Third and Forth village and Xishan Frigho Villages in the rear land of Yantian Port, which was the first urban renewal project of relocation in Shenzhen.

Yantian overall relocation project involves collective joint-stock companies of 4 villages and 13 resident groups, involving about 5,000 original residents, nearly 2,000 buildings need to be demolished. As a typical relocation project with large area, multi-subject and multi-village linkage, Yantian overall relocation project it supposed to fully integrate scarce land resources, improve public service supporting facilities in the rear land area, and promote the area to become a high-quality area with coordinated development of port City.

In *The Chinese People's Political Consultative Conference (CPPCC) Standing Committee recommended suspend some Yantian port projects* (Retrieved from <https://3g.163.com/news/article/EKEG8RNH04178D6R.html>), the problem of stopping is hard to resolve. Illegal urban road will withstand more parking demand, and more time congestion is happening. This would affect normal production and living of citizens. Normal operation of the port could be influenced. Even significant traffic safety hazards might happen and a series of social issues intensify. "So, in the next three or five years, there will be greater traffic pressure in Yantian Port, which will be the most difficult and most painful period of traffic governance" Lu Weiping, Shenzhen CPPCC Standing Committee, pointed out. Moreover, the port extension and the railway construction project restrained the private sectors to use natural resources, such as marine resources, land resources and forest resources. Those 5,000 original residents, who once lived there are influenced. Some factories get their sources of raw materials nearby. Restriction directly and sharply cut their source of production. Local workers would move once their companies relocate. Firstly, to construct the port, authority marked out a non-fishery area. Individuals were not allowed to fish within this area. In addition, increasing trading business and cruises make the port be a commercial port instead of a fishery port. People or small companies relied on marine resource relocate.

#### **(4) Social issues related to polarization between the poor and the rich**

The project has brought many economic benefits to certain groups. For example, some Self Employed Entrepreneurs benefited from the cooperation with HP or the increasing business opportunities as the throughput of cargos or visitors kept increasing. However, people who were forced to move, lost jobs and incomes suffered economic losses. According to *Yantian overall relocation project helps 1344 owners*

to relocate and open the door of happiness (Retrieved from [https://www.sohu.com/a/441490039\\_161795](https://www.sohu.com/a/441490039_161795)), for 5,000 local people, the accessibility in terms of using the natural resources were restricted. On the contrary, YICT and HP benefited from the project and acquire enormous wealth. In this way, there will be a polarization between the rich and the poor. This social phenomenon would increase the uncertainties to the social stabilization. On the one hand, the people who are getting poorer may increase their chances in admitting crimes; on the other hand, the emotion which is against the rich class would increase.

#### **(5) Social issues related to destruction of public security**

As mentioned before, significant traffic safety hazards might happen and a series of social issues intensify, according to *The Chinese People's Political Consultative Conference (CPPCC) Standing Committee recommended suspend some Yantian port projects* (Retrieved from <https://3g.163.com/news/article/EKEG8RNH04178D6R.html>).

With an increasing number of tourists and foreign employees keep rushing in and settling down at Yantian District, the concern in terms of public security issues spread. For instance, according to "Explosive position, backlog, turn ports ... When the epidemic situation will be mitigated" (Retrieved from <https://news.sina.com.cn/o/2021-06-02/doc-ikqcfnaz8770159.shtml>), on May 21st in 2021, an employee surnamed Mu in the West operation area of Yantian Port in Shenzhen was diagnosed with COVID-19. After that, medical staff immediately conducted screening of relevant key groups. Up to June 1, after the third round of nucleic acid testing in Yantian District, a total of 15 asymptomatic cases were detected in the city during the May 21 outbreak. On May 25, Shenzhen Yantian International Container Terminal announced that due to the increasingly serious shipping delays, the storage density of the yard in Yantian Port area is extremely high, which seriously affects the terminal operation efficiency and also leads to traffic congestion around the port area. Therefore, from 22 o'clock on May 25, the port does not receive the export heavy cabinet into the gate. At midnight on May 31, Yantian International Container Terminal resumed receiving containers leaving the port within three days after suspending container entry for five days. It is understood that Yantian Port has accumulated more than 20,000 export containers. According to the arrangement, 5,000 are open to receive every day, and the current processing capacity is only 1/7 of the usual.

Self Employed Entrepreneurs, laborers and citizens became anxious about the public security. Different races and various cultural brought increasing uncertainties to the local communities. Facing the changing social environment, all the stakeholders would be affected. The regression of social security would directly influence the living quality of the Port laborers and citizens.

For Self Employed Entrepreneurs, Port laborers and citizens, impacts are assessed according to questionnaires and outputs are as following.

Table 5.24 Questionnaire 3-2 Output of Self Employed Entrepreneurs' Social Impacts

SEE's Social Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
Social issues related to employment rate	1(1.89%)	2(3.77%)	3(5.66%)	4(7.55%)	0(0%)	4(7.55%)	39(73.58%)
Social issues related to pollution	2(3.77%)	3(5.66%)	7(13.21%)	1(1.89%)	36(67.92%)	1(1.89%)	3(5.66%)
Social issues related to restriction to natural resources	2(3.77%)	2(3.77%)	4(7.55%)	3(5.66%)	2(3.77%)	6(11.32%)	34(64.15%)
Social issues related to polarization between the poor and the rich	3(5.66%)	6(11.32%)	2(3.77%)	2(3.77%)	1(1.89%)	37(69.81%)	2(3.77%)
Social issues related to destruction of public security	1(1.89%)	2(3.77%)	2(3.77%)	3(5.66%)	37(69.81%)	4(7.55%)	4(7.55%)

Table 5.25 Questionnaire 3-2 Output of Port laborers' Social Impacts

PL's Social Impacts Result (No. of respondents (%))	Direct and substantial benefit from the impact (+3)	Benefit from the impact (+2)	Indirect and merely benefit from the impact (+1)	Not influenced by this impact (0)	Indirect and merely suffer from the impact (-1)	Suffer from the impact (-2)	Direct and substantial suffer from the impact (-3)
Social issues related to employment rate	70(64.81%)	8(7.41%)	7(6.48%)	4(3.7%)	6(5.56%)	4(3.7%)	9(8.33%)
Social issues related to pollution	4(3.7%)	2(1.85%)	7(6.48%)	9(8.33%)	4(3.7%)	12(11.11%)	70(64.81%)
Social issues related to restriction to natural resources	7(6.48%)	10(9.26%)	7(6.48%)	4(3.7%)	1(0.93%)	71(65.74%)	8(7.41%)
Social issues related to polarization between the poor and the rich	4(3.7%)	7(6.48%)	9(8.33%)	6(5.56%)	7(6.48%)	67(62.04%)	8(7.41%)
Social issues related to destruction of public security	10(9.26%)	3(2.78%)	4(3.7%)	2(1.85%)	7(6.48%)	11(10.19%)	71(65.74%)

Table 5.26 Questionnaire 3-2 Output of Citizens' Social Impacts

<b>Citizens' Social Impacts Result (No. of respondents (%))</b>	<b>Direct and substantial benefit from the impact (+3)</b>	<b>Benefit from the impact (+2)</b>	<b>Indirect and merely benefit from the impact (+1)</b>	<b>Not influenced by this impact (0)</b>	<b>Indirect and merely suffer from the impact (-1)</b>	<b>Suffer from the impact (-2)</b>	<b>Direct and substantial suffer from the impact (-3)</b>
Social issues related to employment rate	4(3.77%)	8(7.55%)	68(64.15%)	4(3.77%)	2(1.89%)	11(10.38%)	9(8.49%)
Social issues related to pollution	4(3.77%)	5(4.72%)	9(8.49%)	5(4.72%)	7(6.6%)	9(8.49%)	67(63.21%)
Social issues related to restriction to natural resources	8(7.55%)	5(4.72%)	7(6.6%)	4(3.77%)	68(64.15%)	11(10.38%)	3(2.83%)
Social issues related to polarization between the poor and the rich	5(4.72%)	9(8.49%)	4(3.77%)	9(8.49%)	67(63.21%)	3(2.83%)	9(8.49%)
Social issues related to destruction of public security	6(5.66%)	2(1.89%)	4(3.77%)	2(1.89%)	12(11.32%)	6(5.66%)	74(69.81%)

For different stakeholders, analyses are as following.

For YPG, from the YPG's website or any other scientific research, there are sufficient studies focusing on solving economic and environmental problems. However, there are not any research or studies showing that YPG is spending resources in terms of solving these social problems. On the other hand, YPG actually is the admin who are responsible for mitigating the social conflicts.

According to the Yantian Port Group's 2020 Social Responsibility Report (*Retrieved from <http://www.ytport.com/jtgk/jtshzrbg/202106/P020210629655975730356.pdf>*), it has strategic visions:

In accordance with the strategic requirements of building a Shenzhen port brand with outstanding advantages, the group bravely becomes the main force and fresh force of Shenzhen to build a global ocean center city, with "digitalization" as the core engine, adheres to the two-wheel drive of "industrial transformation + capital operation", and innovates talent incentive mechanism. It will optimize internal governance, further consolidate the main business of the port, accelerate the quality and efficiency of the logistics industry, optimize the port supporting industry, cultivate the marine industry, accelerate the realization of the integrated development of "port-industry-city", and strive to build the group into a comprehensive service provider of public terminals. In all, it targeted at being a good industry integrated service provider and industry-city integration integrated service provider. In public view, a higher employment rate could be regarded as YPG's achievement, therefore, the assessment for "employment

rate" is positive. But other social impacts are negative.

For HP, a higher employment rate may result in a higher cost in terms of paying employers' salaries. Therefore, HP hold a negative attitude towards this item. HP's assessment towards "employment rate" is substantially negative. In 1985, Yantian was a sparsely populated and economically backward small fishing village, but now China has become one of the most important international transfer of deep-water port, which has the world's largest container terminal largest container yard. For HP, once the social dissatisfaction has not turned into social events which would raise the public attention and would influence the construction and operation of the project, and there are no other social influences.

To sum up, social impacts assessment result is in the following table. For YPG, it indirectly suffers from social issues related to "pollution", "restriction to natural resources", "polarization between the poor and the rich", "destruction of public security". It benefits from social issues related to "employment rate". For HP, it is not influenced by social issues related to "pollution", "restriction to natural resources", "polarization between the poor and the rich", "destruction of public security". Moreover, it directly and substantially suffers from "social issues related to employment rate". For Self Employed Entrepreneurs, they directly and substantially suffer from social issues related to "employment rate" and "restriction to natural resources". They suffer from social issues related to "polarization between the poor and the rich". They indirectly suffer from social issues related to "pollution" and "destruction of public security". For Port laborers, they directly benefit from social issues related to "employment rate". They directly and substantially suffer from social issues related to "pollution" and "destruction of public security". They suffer from social issues related to "restriction to natural resources" and "polarization between the poor and the rich". For citizens, they indirectly benefit from social issues related to "employment rate". They directly and substantially suffer from social issues related to "pollution" and "destruction of public security". They indirectly suffer from social issues related to "restriction to natural resources" and "polarization between the poor and the rich".

Table. 5.27 Social impacts assessment

Impact	YPG	HP	SEE	PL	Citizens
Social issues related to employment rate	2	-3	-3	3	1
Social issues related to pollution	-1	0	-1	-3	-3
Social issues related to restriction to natural resources	-1	0	-3	-2	-1
Social issues related to polarization between the poor and the rich	-1	0	-2	-2	-1
Social issues related to destruction of public security	-1	0	-1	-3	-3

## 5.2.5 Summary of impact assessment

In this analysis, research question: **(1) To accurately describe and analyze what happened in Shenzhen Yantian port extension project;**

- *What impacts does this project bring to them?*

is answered. The impacts, stakeholders who were influenced and the degree of the influence are presenting as follow table. "(+3)" indicates "Direct and substantial benefit from the impact". "(+2)" indicates "Benefit from the impact". "(+1)" indicates "Indirect and merely benefit from the impact". "(0)" indicates "Not influenced by this impact". "(-1)" indicates "Indirect and merely suffer from the impact". "(-2)" indicates "Suffer from the impact". "(-3)" indicates "Direct and substantial suffer from the impact".

Table. 5.28 Summary of impacts assessment

Impacts		YPG	HP	SEE	PL	Citizens
Economic Impacts	A better port economy	3	3	2	1	1
	Increasing throughput of the port	3	2	3	1	-1
	A Better logistic system	3	2	3	1	1
	More income	2	3	1	1	1
	Property loss due to the project	-1	0	-3	-2	-1
Environmental Impacts	Construction waste	1	2	-2	-1	-2
	Water pollution	1	2	-1	-3	-3
	Natural ecosystem and landscape are destroyed	1	2	0	-1	-2
	Air pollution	1	2	-1	-3	-3
	Noise pollution	1	2	0	-3	-3
Social Impacts	Social issues related to employment rate	2	-3	-3	3	1
	Social issues related to pollution	-1	0	-1	-3	-3
	Social issues related to restriction to natural resources	-1	0	-3	-2	-1
	Social issues related to polarization between the poor and the rich	-1	0	-2	-2	-1
	Social issues related to destruction of public security	-1	0	-1	-3	-3

Besides, based on the criterion of judging the realization of responsible innovation:

- *Are impacts on all the critical stakeholders taken into consideration by the problem owner?*

The answer is "No". There are shortcomings from two perspectives. The first one is that not all impacts are considered. According to *Environmental Protection Acceptance Form of Yantian Port Project Completion Report* (Retrieved from [http://www.ytport.com/tzgg/202001/t20200110\\_6941.html](http://www.ytport.com/tzgg/202001/t20200110_6941.html)), status of logistic system, all environmental related impacts, social issues related to pollution are mentioned, however, other economic and social impacts are not taken into serious account before



the project construction or during the operating period of time. Other reports like corporate social responsibility reports were disclosed by some related listed companies, *Yantian Port (000088.SZ)* for instance, in which not all aspects are described thoroughly.

### **5.3 Value conflict analysis**

Objective is the ideal state a stakeholder wishes to achieve considering his current situation and his deep value. Under the scheme of responsible innovation, the essence of conflicts lies in stakeholders' value-conflicts. At 5.1 section, this study makes a stakeholder analysis, stakeholders who are involved and their attributes such as objectives and resources are presented clearly. At 5.2 section, an impact assessment is made, economic, environmental and social impacts brought by the project on every stakeholder are numerated and the degree how they are influenced are quantified and measured.

At this section (5.3), values of each stakeholder are deduced from their objectives, and rank by the answers of stakeholders in interviews and questionnaires (*Appendix 1, 2 and 3*). By synthesizing with the impacts on each of stakeholder, we formed a VII (Value Impact Index), the difference value between two stakeholders' VII is the measurement in terms of identifying stakeholder's value conflict.

As mentioned at 2.4.1 Fig 2-6 "framework of value conflict analysis", the first step of a value analysis is to identify each stakeholder's values. 'Objective' is the surface form of expression of one stakeholder's value. Therefore, to identify one stakeholder's value, we deduce his values from his objectives. Then, to validate these values, we invite stakeholders to answer the designed questions in the interviews and questionnaires. In combination with the principle of sustainable development, "profit, planet, people", the identification of value is unfolded from economic, environmental and social aspect (*Ravesteijn, W., & He, J. et al., 2014*).

The second step of a value analysis is to sequence the value of each stakeholder. In this study, we invited stakeholders to rank their economic, social and environmental values in the interviews and questionnaires.

The third step is to synthesize the impact assessment with each stakeholder's value sequence. From the previous section, we assess the degree of impacts on each stakeholder. However, to evaluate the real value conflicts between other stakeholders with the problem owner, it requires to combine each stakeholder's values with impacts. In this study, we define an index, which is VII. By measuring the difference in value of VII, we could get a full picture of how do these stakeholders really look

upon these impacts.

The final step is to categorize the value conflicts into three distinct types: HRC (Hard to be Reconciled Conflict), PRC (Possible to be Reconciled Conflict) and ERC (Easy to be Reconciled Conflict). At the latter chapter, for each kind of value conflicts, recommendations are proposed targeting at reconciling the specific value conflicts between problem owner and other stakeholders.

### 5.3.1 Objective-based value identification

#### (1) YPG' Value

In this case, YPG has two diverging identities, as the authority to manage the development of the port and as a company to make profit. At "Yantian Port Group's 2020 Social Responsibility Report", its missions are explicitly mentioned: to fulfill its responsibilities which include managing the society, protecting environment and developing economy (*Yantian Port Group's 2020 Social Responsibility Report*, Retrieved from <http://www.ytport.com/jtgk/jtshzrbg/202106/P020210629655975730356.pdf>).

Economically, YPG's objectives "more taxes" and "more GDP" generated by the project work for its value "macro-economic growth"; "lower cost of the project", "higher revenue of the project", "increasing profit of the project", "increase the throughput" and "increasing number of businesses" work for its value "economic performance of the port" and "profitability (YPG's)"; "better transport infrastructures" works for its value "transport accessibility".

Socially, YPG's objective "provide more working opportunities" works for its value "social stability", "employment" and "a responsible and international public image".

Environmentally, YPG's objective "more eco-friendly" and "less energy consumption" work for its value "an environmentally friendly public image".

Therefore, according to YPG's objectives, its values are referred and they are "macro-economic growth", "economic performance of the port" and "transport accessibility", "social stability", "employment", "a responsible and international public image" and "an environmentally friendly public image".

To validate the study's deduction, all values are confirmed by the YPG. Furthermore, YPG is asked to supplement its value which is not mentioned. See details at Appendix 1.

List of YPG's values:

**Economically:**

- macro-economic growth
- economic performance of the port
- profitability (YPG's)
- transport accessibility

**Socially:**

- social stability
- employment
- a responsible and international public image

**Environmentally:**

- an environmentally friendly public image

**(2) HP's value**

Economically, HP's objectives: "lower cost of the project", "higher revenue of the project" and "increasing profit of the project" work for its values "macro-economic growth", "economic performance of the port" and "profitability (HP's)"

Socially, HP's objectives: "provide more working opportunities" and "have more inter-cultural communication" work for its value "a responsible and international public image".

Environmentally, HP's objective "more eco-friendly" works for its value "an environmentally friendly public image".

To validate the study's deduction, all values are confirmed by the HP. Same as YPG, HP is asked to supplement its value which is not mentioned. "Transport accessibility" is supplemented by HP during the interview.

List of HP's values:

**Economically:**

- macro-economic growth
- economic performance of the port
- profitability (HP's)
- transport accessibility

**Socially:**

- a responsible and international public image

**Environmentally:**

- an environmentally friendly public image

**(3) Self Employed Entrepreneurs' Value**

Economically, Self Employed Entrepreneurs, similar to HP, as independent enterprises which are motivated by making profits and earning a living by expanding or operating business. They always try to acquire higher profits or income. Self Employed Entrepreneurs' objectives of "lower cost", "more revenue", "higher profit", "more opportunities" for businesses can derive their values for "profitability/income".

Socially, as an individual who lives in Yantian District, Self Employed Entrepreneurs are strongly influenced under the social context. Values for "social stability" and "livability" are validated outputs in Questionnaires in Appendix 3-1.

Environmentally, "less energy consumption" is Self Employed Entrepreneurs' objective. Those who live close to the project also think "comfort of living environment" is important and take it as a value.

Taking Questionnaires in Appendix 3-1 into account, the result for Self Employed Entrepreneurs' values is as following.

Table 5.29 Output of Self Employed Entrepreneurs' Values

Values	SEE's Values Result (No. of respondents (%))	Extremely important (+3)	Relatively important (+2)	Very important (+1)	Not important (0)	Weighted Average
Economic Values	macro-economic growth	2(3.64%)	5(9.09%)	5(9.09%)	43(78.18%)	0.38
	economic performance of the port	1(1.82%)	3(5.45%)	8(14.55%)	43(78.18%)	0.31
	profitability	47(85.45%)	6(10.91%)	1(1.82%)	1(1.82%)	2.8
	productivity	0(0.00%)	2(3.64%)	5(9.09%)	48(87.27%)	0.16
	transport accessibility	0(0.00%)	3(5.45%)	0(0%)	50(90.91%)	0.11
Environmental Values	comfort of living environment	6(10.91%)	8(14.55%)	39(70.91%)	2(3.64%)	1.33
	less pollution	0(0.00%)	6(10.91%)	6(10.91%)	43(78.18%)	0.33
	less energy consumption	0(0.00%)	8(14.55%)	6(10.91%)	41(74.55%)	0.4
Social Values	social stability	6(10.91%)	45(81.82%)	0(0%)	4(7.27%)	1.96
	health of people	10(18.18%)	0(0%)	1(1.82%)	44(80%)	0.56
	livability	7(12.73%)	42(76.36%)	6(10.91%)	0(0.00%)	2.02

List of SEE's values:

**Economically:**

- profitability (SEE's business)

**Socially:**

- livability
- social stability

**Environmentally:**

- comfort of living environment

**(4) Port laborers' Value**

Economically, Port laborers target at getting "higher income/salary" and "more working opportunities", which are directly linked with their most cherished values for "income/profitability" and "productivity". They wish to have a stable and increasing salary with the development of the port.

Socially, they want "better welfare" and "better public security" which could derive their values for "Social stability", "Health of people" and "livability".

Environmentally, "better air quality", "better water quality", "less noise", "less garbage" are very common pursue for "comfort of living environment" and "less pollution", which are their values. As citizens live around, less economic losses from the project (protecting their current assets) and livability of their living place are also their core values. They hope that the project would not bring asset losses to them or the authority could compensate their losses, also, they would be unpleasant if the environment is polluted and the livability of the port environment is worsening.

Taking Questionnaires in Appendix 3-1 into account, the result for Port laborers' values is as following.

Table 5.30 Output of Port laborers' Values

Values	PL's Values Result (No. of respondents (%))	Extremely important (+3)	Relatively important (+2)	Very important (+1)	Not important (0)	Weighted Average
Economic Values	macro-economic growth	6(5.66%)	2(1.89%)	20(18.87%)	78(73.58%)	0.4
	economic performance of the port	2(1.89%)	6(5.66%)	25(23.58%)	67(63.21%)	0.41
	profitability	63(59.43%)	41(38.68%)	1(0.94%)	1(0.94%)	2.55
	productivity	60(56.6%)	42(39.62%)	3(2.83%)	1(0.94%)	2.52
	transport accessibility	8(7.55%)	6(5.66%)	25(23.58%)	66(62.26%)	0.58
Environmental Values	comfort of living environment	38(35.85%)	50(47.17%)	3(2.83%)	15(14.15%)	2.05
	less pollution	45(42.45%)	43(40.57%)	3(2.83%)	15(14.15%)	2.11
	less energy consumption	8(7.55%)	6(5.66%)	13(12.26%)	78(73.58%)	0.46
Social Values	social stability	39(36.79%)	45(42.45%)	7(6.6%)	15(14.15%)	2.02
	health of people	41(38.68%)	43(40.57%)	6(5.66%)	16(15.09%)	2.03
	livability	40(37.74%)	44(41.51%)	12(11.32%)	10(9.43%)	2.08

List of LL's values:

**Economically:**

- income
- productivity (company's, YPG, HP)

**Socially:**

- social stability

- livability
- health of people

**Environmentally:**

- comfort of living environment
- less pollution

**(5) Citizens' Value**

Similar to Port laborers, citizens highly value everything related to their living environment and property losses. However, different from Port laborers, they do not have common interests with Self Employed Entrepreneurs. Economically, their core value is to avoid economic losses. Socially and environmentally, they pursue better livability and emphasize much on these.

Economically, "increasing number of businesses" is citizens' objective. They try to avoid economic losses. They think "profitability" is important from economic perspective, which is validated by the questionnaire result.

Socially, "better welfare", "better public security", "offer more working opportunities" are citizens' objectives. They value "Social stability", "Health" and "livability" are also valued most from social perspective. They pursue better living standards and emphasize much on these.

Environmentally, "better air quality", "better water quality", "more eco-friendly", "less noise", "less garbage", "a more beautiful natural landscape" are all their objectives and concerns. Values of "comfort of living environment", "less pollution" and "less energy consumption" are extremely important for them from environmental perspective.

Taking Questionnaires in Appendix 3-1 into account, the result for citizens' values are as following.

Table 5.31 Output of Citizens' Values

Values	Citizens' Values Result (No. of respondents (%))	Extremely important (+3)	Relatively important (+2)	Very important (+1)	Not important (0)	Weight ed Averag e
Economic Values	macro-economic growth	1(0.95%)	1(0.95%)	44(41.90%)	59(56.19%)	0.47
	economic performance of the port	1(0.95%)	3(2.86%)	28(26.67%)	73(69.52%)	0.35
	profitability	0(0%)	0(0%)	63(60%)	42(40%)	0.6
	productivity	1(0.95%)	2(1.90%)	38(36.19%)	64(60.95%)	0.43
	transport accessibility	2(1.90%)	3(2.86%)	45(42.86%)	52(49.52%)	0.54
Environmental Values	comfort of living environment	59(56.19%)	46(43.81%)	0(0%)	0(0%)	2.56
	less pollution	73(69.52%)	30(28.57%)	1(0.95%)	1(0.95%)	2.67

	less energy consumption	63(60%)	38(36.19%)	2(1.90%)	2(1.90%)	2.54
Social Values	social stability	64(60.95%)	40(38.10%)	1(0.95%)	0(0%)	2.58
	health of people	55(52.38%)	48(45.71%)	1(0.95%)	1(0.95%)	2.47
	livability	60(57.14%)	40(38.10%)	2(1.9%)	3(2.86%)	2.5

List of citizen's values:

**Economically:**

- income

**Socially:**

- social stability
- livability
- health of people

**Environmentally:**

- comfort of living environment
- less pollution
- less energy consumption

### 5.3.2 Value sequencing

In this section, all stakeholder's values are sequenced according to interviews and questionnaires. Values are classified into economic value, social value and environmental value which are presented at section 5.3.1. Then, these three categories of values are sequenced in accordance with each stakeholder's preference:

- The value one stakeholder cherished most and is extremely important is assigned “+3”;
- The value one stakeholder regarded as the second important is assigned “+2”;
- The value which is the least important for a stakeholder is assigned “+1”.

Table. 5.32 Summary of value sequence

Stakeholder	Value sequence
<b>YPG</b>	Economic value > Environmental value = Social value  Economic value:3 Social value = Environmental value:2
<b>HP</b>	Economic value > Environmental value > Social value  Economic value:3 Environmental value: 2 Social value: 1
<b>SEE</b>	Economic value > Social value > Environmental value  Economic value: 3 Social value: 2 Environmental value:1

Stakeholder	Value sequence
<b>PL</b>	Economic value > Social value = Environmental value  Economic value: 3 Social value = Environmental value:2
<b>Citizens</b>	Social value = Environmental value > Economic value  Social value:3 = Environmental value:3 Economic value:1

YPG and HP are asked to rank their economic, environmental and social values. Details can be found at Appendix 1 and 2.

### (1) YPG

One possible explanation of YPG's choice is: Under the economic development centralized principle, in combination with YPG's identity, as the authority in this case, economic value is YPG's priority. Environmental and social value are also important for him, but both of them have the same importance level.

### (2) HP

One possible explanation of HP's answer is: HP is a commercial organization; economic value is its priority. And as an international company, environmental value is more important than the social value. Eco-friendly image is way more important than before. Eco-friendly is explicit mentioned in "Vision for Maritime cooperation" (NDRC, 2015). Therefore, in HP's eyes, environmental value is more important than the social value.

### (3) Self Employed Entrepreneurs

**Economic value (3) > Social value (2) > Environmental value (1).**

Taking Questionnaires in Appendix 3-1 into account, the result for Self Employed Entrepreneurs' value sequence is as following. Most respondents think Economic value is the most important. Social value ranks second and environmental value is the least important one.

Table 5.33 Output of Self Employed Entrepreneurs' Value Sequence

SEE's Value Sequence	The most important	The second important	The least important
Economic Value	45(84.91%)	3(5.66%)	5(9.43%)
Environmental Value	5(9.43%)	3(5.66%)	45(84.91%)
Social Value	5(9.43%)	39(73.58%)	9(16.98%)

According to Table 5.29 Output of Self Employed Entrepreneurs' Values in the previous section, except for those respondents with "not important" choice, average of economic value is mathematically larger than social value. Average of environmental



value is the smallest. The result of which could also be a supplement.

The possible explanation of this result may be: for Self Employed Entrepreneurs, its priority is to make business and increase its profits. Its social and environmental values serve for the achievement of its economic value. In terms of social impacts, most of them would bring negative influence on them, which have raised attention of the Self Employed Entrepreneurs, and they have a strong motivation to change the situation. When compared, environmental impacts have not raised their concentration and to some extent, Self Employed Entrepreneurs have position that they do not want to change the situation as they are beneficiaries of a loose environmental regulation. In this way, economic value is ahead of social and environmental value and social value weighs heavier than environmental value.

#### **(4) Port laborers**

**Economic value (3) > Social value (2) = Environmental value (2).**

Taking Questionnaires in Appendix 3-1 into account, the result for Port laborers' value sequence is as following. Most respondents think Economic value is the most important. Social value and environmental value have similar ranks.

Table 5.34 Output of Port laborers' Value Sequence

PL' Value Sequence	The most important	The second important	The least important
Economic Value	79(73.15%)	10(9.26%)	19(17.59%)
Environmental Value	17(15.74%)	85(78.7%)	6(5.56%)
Social Value	14(12.96%)	82(75.93%)	12(11.11%)

According to Table 5.30 Output of Port laborers' Values in the previous section, except for those respondents with "not important" choice, average of economic value is mathematically larger than social value. Average of environmental value is almost equal to average of social value. The result of which could also be a supplement.

The possible explanation of this result may be: on the one hand, Port laborers stand for their employers, as their income are highly depended on their employer's economic performances. In this sense, their position in social value as well as environmental value do not play the same important role as a normal citizen. On the other hand, as normal inhabitants who live just around the port, the environmental and social impacts did directly influence their daily lives. Therefore, for Port laborers, the economic, social and environmental value rank the same rating in their mind.

#### **(5) Citizens**

**Social value (3) = Environmental value (3) > Economic value (1)**

Taking Questionnaires in Appendix 3-1 into account, the result for citizens' value sequence is as following. Most respondents think Economic value is the least important. Social value and environmental value have similar ranks which are the most important ones.

Table 5.35 Output of Citizens' Value Sequence

Citizens' Value Sequence	The most important	The second important	The least important
Economic Value	12(11.32%)	7(6.6%)	87(82.08%)
Environmental Value	83(78.3%)	12(11.32%)	11(10.38%)
Social Value	82(77.36%)	10(9.43%)	14(13.21%)

According to Table 5.31 Output of Citizens' Values in the previous section, except for those respondents with "not important" choice, average of economic value is mathematically smaller than social value. Average of environmental value is almost equal to average of social value. The result of which could also be a supplement.

Citizens are the people who live in Yantian District, mainland China. Anything related to the livability of the living environment, including public security and pollution would directly influence the living quality of them. Therefore, social and environmental value are cherished highly by them. The project partly changed the economic fabric of the local community, their lives are fundamentally influenced. Economic value is highly cherished by citizens, however, because their jobs may be diverse, they have higher resistance in terms of facing the economic changes brought by the project. Therefore, for them, economic value is relatively less important.

### 5.3.3 Synthesizing VCI (Value Conflict Index)

Previously, we assessed the degree of impacts brought by project to each stakeholder objectively. In fact, the real feeling of an stakeholders in terms of the project impacts is a superposition of each stakeholder's subjective perception of the impacts on the degree of impacts. Therefore, in this section, we synthesize the stakeholders' value ranking and the degree of impact assessment to simulate the real feeling of each impact on every stakeholder.

We define a "Value Impact Index (VII)" to represent each stakeholder's subjective feeling of each impact brought by the project. This index is a product of the number assigned which represents each stakeholder's value (economic, social and environmental) and the degree of impact. Difference of VII between a stakeholder and the problem owner is defined as "Value Conflict Index (VCI)" which is to measure difference of the synthesizing effect of each stakeholder's value (economic, social and environmental) and the degree of impact, which could be negative or positive and the absolute value can represent the level of influence.

Here is how this index derived:

- In Stakeholder Analysis:

$i = \{ \text{"YPG, HP, PL, SEE, Citizens"} \}$

- In Impact Analysis:

$j = \{ \text{"Economic, Environmental, Social"} \}$

- In Value Conflict Analysis:

$VII = Impact_{(i,j)} \times Value_{(i,j)}$

$VCI = VII_{(i,j)} - VII_{(YPG,j)} = Impact_{(i,j)} \times Value_{(i,j)} - Impact_{(YPG,j)} \times Value_{(YPG,j)}$

The output of the VCI for each stakeholder is shown as following. The absolute number of which is larger than or equal to 8 is marked in red background color. The absolute number of which is larger than 6 and equal to 7 is marked in yellow background color.

### 5.3.4 Value-conflict identification

Comparing the Value Impact Index (VII) of other stakeholders and of YPG, we can find a gap between YPG's and other stakeholders' attitude in terms of the same impact. By comparing these gaps, we identify the value-conflicts between other stakeholders and YPG. We use the other stakeholders' VII value to minus YPG's VII and get a gap value. The absolute number of this gap represents the degree of disagreement between other stakeholders and YPG at certain impact. The bigger the number means the degree of disagreement on this impact between YPG and other stakeholders is relatively higher, otherwise, the degree is relatively lower.

Table. 5.36 Output of VCI (Value Conflict Index)

Impact		HP-YPG	SEE-YPG	PL-YPG	Citizens-YPG
Economic value	A better port economy	0	-3	-6	-8
	Increasing throughput of the port	-3	0	-6	-10
	A Better logistic system	-3	0	-6	-8
	More income	3	-3	-3	-5
	Property loss due to the project	3	-6	-3	2
Environmental value	Construction waste	2	-4	-4	-8
	Water pollution	2	-3	-8	-11
	Natural ecosystem and landscape are destroyed	2	-2	-4	-8
	Air pollution	2	-3	-8	-11
	Noise pollution	2	-2	-8	-11

Impact		HP-YPG	SEE-YPG	PL-YPG	Citizens-YPG
Social value	Social issues related to employment rate	-7	-10	2	-1
	Social issues related to pollution	2	0	-4	-7
	Social issues related to restriction to natural resources	2	-4	-2	-1
	Social issues related to polarization between the poor and the rich	2	-2	-2	-1
	Social issues related to destruction of public security	2	0	-4	-7

From the table, the main conflicts between YPG and other stakeholders are presented. According to the value, we classify the conflicts between other stakeholders and YPG into three categories:

- Hard to be reconciled conflict (gap value larger than or equal to 8);
- Possible to be reconciled conflict (gap larger than or equal to 6);
- Easily to be reconcile conflict (gap less than or equal to 5).

The threshold is set according to the result of VCIs. We derive the following table from Table. 5.36 Output of VCI (Value Conflict Index). Around 30% of VCI numbers are larger than or equal to 6. Around 20% of VCI numbers are larger than or equal to 8. Here we choose 6 and 8 as the thresholds to categorize different impacts and values for stakeholders.

Table. 5.37 Accumulated probability of VCI output of the case

Absolute VCI	No.	Accumulated prob.
0	5	8.33%
1	3	13.33%
2	16	40.00%
3	10	56.67%
4	6	66.67%
5	1	68.33%
6	4	75.00%
7	3	80.00%
8	7	91.67%
10	2	95.00%
11	3	100.00%

#### (1) Hard to be reconciled conflict

“Hard to be reconciled conflict” applies for the conflict which has feasibility to be reconciled, but the resolution of the problem requires huge compromises for both

sides. The VCI value of this type of conflict is equal to or larger than 8 which means at least one part, either YPG or the other stakeholder regards this impact valuable and the influence is substantial. To solve the conflict peacefully, it requires both sides to make some concessions.

To sum up, the "Hard to be reconciled conflicts" are:

- Environmental problems, mainly about water, air and noise pollution. The disagreement mainly lies in the value conflicts between YPG and PL & Citizens in value "Comfort of living environment", "Health of people" and "Less pollution". PL and citizens take these values important while YPG do not.
- Economic problems, "A better port economy", "A better logistic system" and "Increasing throughput of the port" are main concerns. The conflicts lie between YPG and Citizens. In YPG's value system, "Macro-economic growth", "Economic performance of the port", "Profitability" and "Transport accessibility" mean a lot, while in citizens' eyes, these are not its value.
- Social problems, social issues related to employment is core issue. The conflict lies between YPG and SEE in YPG's value "employment".

The following table shows main areas of "Hard to be reconciled conflicts" between the problem owner YPG and the different stakeholders concerning the project.

Table. 5.38 Summary of "Hard to be reconciled conflicts"

No	Stakeholder	Value	Value conflict	Impact
1	SEE	Social value	Employment (YPG)	Social issues related to employment rate
3	PL	Environmental value	Less pollution (PL)	Water pollution
4				Air pollution
5			Comfort of living environment (PL)	Noise pollution
6	Citizens	Economic value	Macro-economic growth (YPG)	A better port economy
7			Economic performance of the port (YPG)	Increasing throughput of the port
8			Profitability (YPG)	
			Transport accessibility (YPG)	A Better logistic system
9		Environmental value	Comfort of living environment (C)	Construction waste
10				Natural ecosystem and landscape is destroyed
11			Health of people	Water pollution
			Less pollution (C)	
12				Air pollution
13				Noise pollution

## (2) Possible to be reconciled conflict

“Possible be reconciled conflict” is solvable. Specifically, the absolute gap is between 8(not included) and 6(included). In most cases, the conflicts came from one stakeholder who sees some value important while the other does not hold the same weights. The impact brought substantial influence on one side but not for the other side. In this situation, YPG could make some compromise to mitigate the conflicts, in other words, this kind of conflicts are solvable.

"Possible to be reconciled conflicts" mainly lie in:

- Economic problems, "A better port economy", "A better logistic system" and "Increasing throughput of the port" are main concerns. The conflicts lies between YPG and LL, the conflicts derives from their value conflict "Economic performance of the port", "Profitability" and "Transport accessibility" between YPG and LL. In addition, YPG and SEE have value conflict in "Property loss due to the project". It is because YPG and SEE both pursue their own profit and YPG care "Economic performance of the port" while SEE do not hold the same value.
- Social problems, social issues related to employment, pollution and destruction of public security are core issues The conflict lie between YPG and HP and citizens. YPG cares the employment while HP do not value that much. On the contrary, citizens care the livability of the port while YPG ignored.

The following table shows main areas of "Possible to be reconciled conflicts" between the problem owner YPG and the different stakeholders concerning the project.

Table. 5.39 Summary of “Possible be reconciled conflict”

No	Stakeholder	Value	Specific value	Specific impact
1	HP	Social value	Employment (YPG)	Social issues related to employment rate
3	SEE	Economic value	Economic performance of the port (YPG) Profitability (YPG & SEE)	Property loss due to the project
4	PL	Economic value	Economic performance of the port (YPG)	A better port economy
5			Profitability (YPG)	Increasing throughput of the port
6			Transport accessibility (YPG)	A Better logistic system
7	Citizens	Social value	Livability (C)	Social issues related to pollution
8				Social issues related to destruction of public security

### (3) Easily to be reconciled' conflict

By contrast, the value conflicts which gap lower than 6(not included) are defined as “Easily to be reconciled conflict”. Normally, this type of value conflicts is easy to be reconciled, the conflict is neither substantial nor important for both HP and the other stakeholder. In this analysis, we do not pay much attention on this kind of conflict.

### 5.3.5 Summary of analysis

In this analysis, research question:

- *What are their value conflicts with the problem owner (Chinese port authority)?*

is answered. The value conflicts between YPG and other stakeholders are summarized in the following table:

Figure. 5.40 Summary of Conflicts

Conflicts category	Value type	Specific value conflict	Stakeholder
Hard to be reconciled conflict	Economic	Macro-economic growth Economic performance of the port Profitability Transport accessibility	Citizens
	Environmental	Health of people Less pollution Comfort of living environment	PL, Citizens
	Social	Employment	SEE
Possible to be reconciled conflict	Economic	Economic performance of the port Profitability Transport accessibility	SEE, PL
	Social	Employment Livability	HP, Citizens
Easily to be reconciled conflict	/	/	/

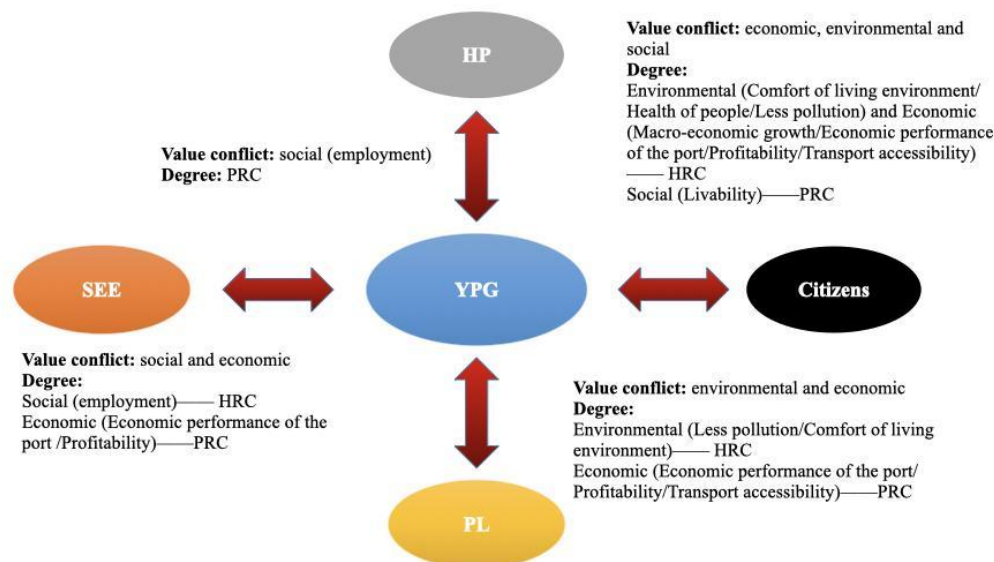
According to the conflicts categories, it is easy to find:

- “Hard to be reconciled conflict” are mainly about
  - 1) YPG's economic and social values are not other stakeholders’.
  - 2) YPG failed in managing pollution and environmental problems
 the value conflicts lie in mostly between SEE, PL and citizens with YPG.  
 To solve these problems requires all parties’ efforts, YPG will not be able to solve these problems by its own. Cooperation among all stakeholders is obliged.
- “Possible to be reconciled conflicts” are mainly about economic impacts and social impacts brought by the project and YPG. In this sense, YPG is able to change the current situation, but it depends on its willingness and choice of its value.
  - 1) YPG's economic and social values are not other stakeholders’.

At stakeholder dimension:

- The main value conflicts between YPG and HP lie in social aspect. The disagreement about employment.
- The main value conflicts between YPG and Self Employed Entrepreneurs lie in economic and social aspects. Among which, social disagreement in employment is the hardest conflict to be mitigated. When compared, economic conflict is negotiable.
- The main value conflicts between YPG and Port laborers lie in economic and environmental aspects. Environmental value conflict is the relative more difficult one to bring two parts together. For economic value, two parts have disagreement but is solvable.
- The main value conflicts between YPG and Citizens lie in economic, environmental and social all three aspects. Same as Port laborers, environmental value conflict is the most serious. However, economic value conflicts are also hard to reconcile, by contrast, social value conflicts are relatively easy to be mitigated.

Figure. 5.41 Summary of Conflicts between YPG and other stakeholders



Besides, based on the criterion of judging the realization of responsible innovation:  
 - Are there any value conflicts between other critical stakeholders and problem owner?



The answer is “YES”.

As mentioned in the value conflicts section for this case, there are value conflicts between other critical stakeholders and problem owner. Moreover, there may exist conflicts between other stakeholders which are not analyzed in this paper. In all, Shenzhen Yantian port extension project hasn't realized responsible innovation. Reasonable recommendations will be given accordingly to help it and other Chinese ports to achieve Responsible Innovation.

## **5.4 Analytical result of the Shenzhen Yantian port extension project**

In this chapter, research questions regarding this project are answered firstly. Recommendations concerning value conflicts are brought out secondly.

At Shenzhen Yantian port case, Responsible Innovation is introduced as a scientific method in studying this topic. Under the framework of Responsible Innovation, the specific research questions of Shenzhen Yantian port extension project mentioned in 4.2.2 are as following:

**(1) To accurately describe and analyze what happened in Shenzhen Yantian port extension project;**

***- Who are influenced by this project?***

A stakeholder analysis is made with regard to answer the question "Who are influenced by this project?". Several critical findings are concluded from the analysis:

- **HP, Self Employed Entrepreneurs, Port laborers, Citizens are classified as critical stakeholders**

In this particular case, stakeholders are those whom YPG is advised to pay more attention on because they have their own explicit objectives and own dispensable resources, positions in policy-making mechanism in Yantian port. YPG, HP, SEE, PL, Citizens are identified as the stakeholders in this case.

From the stakeholder analysis, we conclude that all stakeholders have diverging objectives, some exert important function in decision making process in Yantian port. To put the extension project forward, YPG needs to know them well and try its best to cooperate with them strategically.

***- What impacts does this project bring to them?***

An impact assessment is made for the purpose of understanding what impact has this project brought to local communities, these stakeholders and to which extent these impacts influenced them.

**● Economic, environmental and social impacts are brought by the project to different stakeholders.**

Economically, the project made the port economy become better, increased the throughput of the port, improved the logistic system and brought more income. YPG, HP, Self Employed Entrepreneurs substantially benefited from these economic improvements, while port laborers and citizens benefited at a limited level. However, it also caused property losses for Self Employed Entrepreneurs, Port laborers and citizens. YPG, as a 100% state-owned enterprise, also takes responsibility in leading to other stakeholders' property losses.

Environmentally, many kinds of pollution appeared. Waste pollution, water pollution, air pollution and noise pollution severely decline the livability of the living environment of Yantian District. The natural ecosystem was destroyed and landscape was changed, people suffered from construction of the three phases projects. YPG and HP are blamed for bringing these negative environmental impacts. Port laborers and citizens are directly and negatively influenced.

Socially, social issues raised from pollution, people's rights of using natural resources are restrained. In addition, public security was getting worse and the polarization between rich and poor was getting more obvious. Economic losses, pollution and other issues have increased the uncertainties of the society, people became more anxious towards the project. However, the project has brought thousands of working opportunities, the employment rate has experienced a rise and the economy kept booming.

**● Each impact is evaluated to every stakeholder in this case.**

According to whether the impact is in line with one stakeholder's objective and the degree how this impact influences the stakeholder, each impact is evaluated, which is shown in Table. 5.28. For economic impacts, stakeholders have different opinions of impact importance about "A better port economy", "Increasing throughput of the port", "A Better logistic system", "More fiscal income", "Property loss due to the project". For economic impacts, stakeholders have different opinions of impact importance about "Construction waste", "Water pollution", "Natural ecosystem and landscape is

destroyed", "Air pollution", "Noise pollution". For social impacts, stakeholders have different opinions of impact importance about social issues related to "employment rate", "pollution", "restriction to natural resources", "polarization between the poor and the rich", "destruction of public security".

***- What are their value conflicts with the problem owner (YPG)?***

Economic, environmental and social value stands different positions in every stakeholder's mind.

In each stakeholder's mind, economic, environmental and social value have different weights. This is the reason why they showed preference towards certain impacts. For YPG, economic value weighs heavier than environmental and the social value. For HP, economic value weighs heavier than environmental than the social value. For Self Employed Entrepreneurs, economic value weighs heavier than the social value than environmental value. For Port laborers, economic value weighs heavier than the social value and environmental value. For citizens, environmental value weighs equal to the social value but more than environmental value.

- **In combination of the impacts brought by the project (every stakeholder has different levels of impacts) and the value sequence perceived by each stakeholder, the value conflicts between YPG and other stakeholders are derived.**

Value conflicts between YPG and other stakeholders are classified into three types: "hard to be reconciled conflicts", "possible to be reconciled conflicts" and "easy to be reconciled conflicts".

For "hard to be reconciled conflicts", environmental value conflicts lie between YPG and PL & Citizens, especially in value "Comfort of living environment", "Health of people" and "Less pollution". Economic value conflicts lie between YPG and Citizens. In YPG's value system, "Macro-economic growth", "Economic performance of the port", "Profitability" and "Transport accessibility" mean a lot, while in citizens' eyes, these are not its value. Social value conflicts lie between YPG and SEE in YPG's value "employment".

For "possible to be reconciled conflicts", economic value conflicts lie between YPG and PL in "Economic performance of the port", "Profitability" and "Transport accessibility". In addition, YPG and SEE have value conflict in "Property loss due to the project". Social value conflicts lie between YPG and HP and citizens. YPG cares the employment while HP do not value that much. On the contrary, citizens care the livability of the port while YPG ignored.

**(2) According to the description and the study framework, define criterion of responsible innovation and apply criterion to judge whether Shenzhen Yantian port has realized Responsible Innovation;**

Criteria of responsible innovation is defined as following.

- *Did all the critical stakeholders come into problem owner's sight?*
- *Are impacts on all the critical stakeholders taken into consideration by the problem owner?*
- *Are there any value conflicts between other critical stakeholders and problem owner?*

In this study, if answers to the first and second questions are "Yes" and answer to the third question is "No", we would conclude that "Shenzhen Yantian port realized Responsible Innovation"; on the contrary, in other situations, we would conclude "Shenzhen Yantian port is failed in realizing Responsible Innovation".

Considering all the analyses made above, we could get a conclusion that ***Shenzhen Yantian port has not realized Responsible Innovation on basis of the criterions.***

Firstly, not all the critical stakeholders come into problem owner's sight, for instance, Port laborers and Self Employed Entrepreneurs' voices are not heard. Secondly, not all impacts on all the critical stakeholders are taken into consideration by the problem owner in decision-making. The problem owner, which is YPG in the case, emphasizes on its own preference for impacts and may ignore other stakeholders' impacts. Thirdly, as mentioned in the value conflicts section for this case, there are value conflicts between other critical stakeholders and problem owner.

In all, Shenzhen Yantian port extension project hasn't realized responsible innovation. Reasonable recommendations will be given accordingly to help it and other Chinese ports to achieve Responsible Innovation.

**(3) Give reasonable recommendations to Chinese ports in terms of achieving Responsible Innovation.**

Recommendations targeted at solving specific value conflicts mentioned in this case are proposed and discussed in the next section, from which conclusions will be illustrated about recommendations to Chinese ports in Chapter 7.

### **5.4.1 Recommendation**

Recommendations are brought out concerning value conflicts. Establishment of a

governance mechanism is suggested firstly to resolve value conflict. Then, Multi-stakeholder Negotiation Committee (MANC) is supposed to be held to take more opinions from different stakeholders into account. Thirdly, recommendations for Yantian Port extension project Case are illustrated in detail. Lastly, some specific measures are brought out and pollution problem is taken as an example to show how these measures work.

### **(1) Establish a governance mechanism to resolve value conflict**

As the cooperation is strongly needed to mitigate the “Hard to be reconciled conflicts” and “Possible to be reconciled conflicts”. A governance mechanism is introduced in order to resolve the value conflicts in the case of Yantian Port. Such a governance mechanism has already been tested in western countries (*Dix, 2010; Lichtenberg, 2005*). For example, in the case of the Rotterdam Port, there is a Quality Control Round Table (Tafel van Borging) consisting of representatives of all parties and stakeholders; its chairperson is a former Dutch minister (*Dekker, 2013*). This Table monitors the Rotterdam Mainport Development Project, a series of projects which aim at improving both the position of the Rotterdam Port in the world and the livability of the area, and tackles problems that emerge, of which the Maasvlakte 2 project is a main cause (*Ravesteijn, 2016*).

In this particular case, in Yantian Port, YPG is facing almost the same dilemma. On the one hand, it wishes to improve Yantian Port’s position in international trade; on the other hand, it engages in improving the welfare of the local people or at least to improve its image in local communities. Therefore, a similar mechanism used in Rotterdam could be introduced to Yantian Port aimed at tackling the value conflicts.

However, the situation is slightly different here, it requires YPG to play an increasing active role in this mechanism. HP takes the larger share in YICT, which is the constructor and operator of the port, however, it does not have the authorized power. In mainland China, YPG is the state-owned enterprise which could deliver authority power more easily. Organizing such a negotiation committee (Quality Control Round Table) is needed. It tends to solve the conflicts between other stakeholders and YPG by investing more resources in monitoring ports construction. Therefore, in Yantian Port, YPG is required to organize such a committee by its own, as a funder. Organizing such a committee which consists of all the stakeholders concerning the project is not enough. The committee will help resolve conflicts by holding meetings, sharing opinions, advising on key issues and taking each stakeholder's attitudes into account. The work of the committee could be considered thoroughly and play a real part in accomplishing projects.

### **(2) Multi-stakeholder Negotiation Committee (MANC)**

In Yantian Port, YPG is supposed to take the initiative to establish a

Multi-stakeholder Negotiation Committee (MANC). This committee should consist of all the stakeholders involved in this project, from its infancy to its future operation period. YPG, HP, representatives of Self Employed Entrepreneurs, representatives of Port laborers and representatives of citizens, even the representatives of international companies should be invited to join the organization, as a participant of the project to sit down together and discuss every crucial decision of the project. MANC is improved to fit in this kind of construction and operation projects and focus more on the whole process of projects, which is not exactly the same as QCRT (Quality Control Round Table) (*Dekker, 2013*).

Referencing the experiences from Rotterdam Maasvlakte project, the establishment of this MANC is based on three principles (*Ravesteijn, 2016*):

- (1) All stakeholders should have full and equal rights to be fully informed about the project and its positive and negative impacts in advance, and they should be able to ask for any information and give their feedback during the whole process of a project.
- (2) Decision-making should be made in consultation with all the stakeholders in a fair, transparent and accountable way.
- (3) There should be a clear division of responsibilities with regard to the project developers, decision-makers and involved government officials and these initiators, regulative and other stakeholders must be fully accountable to the stakeholders (*Ravesteijn, 2016*).

Besides, MANC is required to play negotiation function in three distinguished phases: Pre- project phase, Project execution phase and post-project phase.

In combination of the three principles, at Pre-project phase, YPG is recommended to submit an assessment report which fully includes the latest information of the project. Under the MANC scheme, all the members will discuss the report and make sure they are fully informed and understand the information of the project. MANC will consult and take into serious consideration all members' suggestions. A formal decision is going to be made based on negotiation. Furthermore, the decision should be related with every stakeholder's responsibility.

At execution phase, any information with regard to the project will be transparently reported to MANC. Any complaint or disagreement will be discussed and negotiated within the committee in an open and fair way.

At the post-project phase, the impact of the project will be re-evaluated. Based on the evaluation, stakeholders who suffered the greatest losses will be compensated. Also, fulfillment of every stakeholder's responsibility will be re-evaluated. Stakeholders

who failed in fulfilling its responsibilities during the prior phases are supposed to compensate for others after negotiation.

### **(3) Recommendations to mitigate value conflicts of the Case**

To solve specific value conflicts mentioned in this case, there are several recommendations as following:

To fundamentally mitigate the conflicts between YPG and other stakeholders, a governance mechanism is proposed referencing to the Rotterdam Maasvlakte 2 project. A multi-stakeholder negotiation committee is recommended to establish under the "fully inform and consult", "fair, transparent and accountable" and "clear division of responsibilities" three principles.

Fundamentally, YPG is advised to share its economic achievement with other stakeholders and pay increasing attentions on environmental protection, sustainable development and social governance, instead of its previous "economic center" developing strategy.

Practically, YPG is recommended to take certain actions to mitigate the conflicts with other stakeholders under the MANC framework. Actions are specified according to the project stage, the project is divided into three phases, which is pre-stage, processing and post stage.

At pre-project phase, abandon its "economic center" development theory, allocate increasing resources in environmental protection and social governance. Before investing the project, relative stakeholders panoramically consider about economic, environmental and social risks. Conclusions could be put in the project feasibility study report before execution of the project to provide information for making investment decisions.

At project execution phase, establish an effective communication platform, such as MANC, offer other stakeholders a fair, transparent and accountable chance to freely express their opinions. Respect other stakeholders' rights to be fully informed about the project and listen to their feedback. Sharing own profits with other stakeholders in terms of lifting livability of the place and try to achieve common wealth in the end.

At post-project phase, YPG is advised to continuously put efforts in terms of caring economic, environmental and social impacts brought by the project.

Strategically, according to the conclusion from the stakeholder analysis, YPG is recommended to form certain allies with HP, who has potential to be YPG's strong ally; try to win the support from Self Employed Entrepreneurs and Port laborers and

alleviate the contradictions with citizens (who is analyzed to be barking dogs in stakeholder analysis).

#### **5.4.2 Specific measures to deal with value conflicts, take pollution problem as an example**

Specifically, firstly, to mitigate the environmental conflicts, which is mainly about pollution and environmental destruction, YPG is advised to:

(1) At Pre-project phase, YPG is obliged to submit an environmental assessment report related to the construction plan, to MANC, under the “MANC three principles”, fully informed all parties, including HP, representatives of Self Employed Entrepreneurs, laborers and citizens.

(2) If the construction plan failed to pass the MANC, YPG is advised to re-offer an advanced report or cancel the plan. On the contrary, if the plan wins the approval of the MANC, YPG is required to execute the plan as it promised. At this stage, all the parties are referees, who are scrutinizing the project execution.

(3) At the post project phase, once YPG finished the project, it is obliged to submit an assessment report aiming to assess the environmental impacts. Annual retrospect is also required under MANC mechanism. Moreover, important issues regarding the project are needed in its annual report's disclosure.

Same for social conflict, mainly about “employment”, same advice is proposed targeted at helping YPG to mitigate the contradiction with HP and Self Employed Entrepreneurs. However, the assessment report should focus on local labor market.

Other problems including problems related to property loss and economic benefits, it is strongly recommended that YPG increases the participation and involvement of other stakeholders under MANC framework.



## 6. Conclusion

International cooperation in port construction and operation experienced a sharp increase. International cooperation is an unstoppable trend which is explicitly written in "Vision for Maritime cooperation (NDRC, 2015)". On the other hand, participation of these foreign parties also increased the complexity of the project, new stakeholders stepped in, unexpected impacts are brought to the local communities and all of these changes shaped a new environment for Chinese ports.

However, traditional Chinese port management is still following an economy centralized principle, by contrast, environmental and social conflicts have been seriously ignored. In this way, conflicts continue appearing and an updating theory which is able to solve diverging objectives, which are "development" and "harmony" is urgently needed. Responsible innovation is such an approach.

### 6.1 Conclusion of the research

In this study, Shenzhen Yantian port extension project is introduced for the purpose of studying the research question:

***- Have Chinese ports seriously considered the value conflicts with other stakeholders and realized Responsible Innovation?***

The answer to the first question is NOT COMPLETELY.

In Shenzhen Yantian case:

Some stakeholders are ignored by Chinese ports at pre-project, in the process of the project and post project phase. This study searches many related documents which includes EIA or SIA of the project, but not all stakeholders are mentioned.

Some impacts are ignored by Chinese ports at pre-project, in the process of the project and post project phase. By studying the materials, this study summarized 15 impacts brought by this project on stakeholders, but not all of them are taken into serious consideration by these Chinese ports.

Several value conflicts in terms of impacts brought by the project are detected by this study. However, these value conflicts do not draw enough attentions of Chinese ports.

As is known to all, Shenzhen is the first city which experimented China's "Reform and open" strategy. And Yantian is one of the most open and tolerate port in China.

However, from the study, we still get a final conclusion that Shenzhen Yantian port failed in realizing complete responsible innovation. Therefore, the answer to the first question is NOT COMPLETELY.

Now that Chinese ports have not realized responsible innovation completely, recommendations are proposed to assist them in completely realizing responsible innovation, which is also the answer to the second research question:

***- How can Chinese ports from their best efforts bridge the value gaps, realize Responsible Innovation?***

**The first recommendation is to establish a multi-stakeholder negotiation mechanism.**

In Shenzhen Yantian case of this study, it is called MANC (Multi-stakeholder Negotiation Committee) and in Rotterdam Maasvlakte project it is called Round Table (*Ravesteijn, 2016*). This mechanism will build a communication channel which bridge the value conflicts between stakeholders who may involve and the decision maker, across the whole lifecycle of the project. This mechanism guarantees that:

- Potential stakeholders who are influenced by this project will be brought into decision maker's vision, as all of them at least have rights to elect one representative to present their opinions, defense their values;
- Impacts have a public channel to respond and feedback to the decision makers at a very short time since their first appearance;
- Value conflicts have a place to present and negotiate, even to compromise among stakeholders, and potential solutions may be found. And more importantly, by the communication among the stakeholders, understanding will form among stakeholders.

**The second recommendation is that when the project owner is trying to mitigate the conflicts with other stakeholders, it should take different strategies.**

Because different stakeholders have diverging objectives, resources and positions in decision making process and interdependency, most importantly, they have different values. The essence of these conflicts are value conflicts. Therefore, project owner is recommended to target at reconciling value conflicts between stakeholders and

themselves, take different strategies instead of using a single one.

## **6.2 Limitation**

In this research, responsible innovation is applied as the method to study the Chinese ports under a multi-stakeholder circumstance. Responsible innovation offers us a very unique angle of looking upon this topic, it focuses on value conflicts between problem owner and other stakeholders. However, it is not the only scientific way to study this topic. Many other methods are also effective in studying this topic. Besides, there are three main limitations affect the final conclusion of the responsible innovation.

### **● Limitation of data volume**

Firstly, due to the covid-19, China executes strict social distancing regulations. Due to this reason, the distributed number of questionnaires (targeting at investigating including interests, objectives, impacts and values etc.) is relatively small. The initial design is to distribute 500 questionnaires to Self Employed Entrepreneurs cover all industries, 1000 to Port laborers cover Chinese and foreign laborers who work at the Yantian district and 1000 to citizens cover different ages. However, due to the covid-19, in practice, this study only distributed 160 to Self Employed Entrepreneurs (mainly are individual shops at Yantian district), 300 to Chinese port laborers who work at Yantian port and 300 to citizens at Yantian district (see details at table 2.4 data validation).

Therefore, the accuracy of final data is influenced. And the way to distribute the questionnaires is to send questionnaires to WeChat group and to fill in the questionnaires online. In this way, the dispersion of the questionnaires may be influenced. Besides, stakeholder analysis, impact assessment and value analysis are based on the data or description of the questionnaires. In this sense, the accuracy of outcomes of these analyses still have space to lift.

### **● Limitation of interview accuracy**

Secondly, also due to the limitation issued by Chinese government in terms of restriction in travelling, this study failed to travel to Hongkong Hutchison Whampoa company to interview the management from this company. In this study, we interviewed a senior manager from China State Ship-building Cooperation (CSSC) instead. CSSC makes the same types of business with HP and also an international company whose businesses cover all over the world. However, there are still some differences between these two companies, such as development strategies, advantages etc. As the stakeholder analysis, impact assessment and value analysis are based on the data or description of the interview. Therefore, the accuracy of outcomes of these analyses would be influenced.

There are some other limitations in this study, such as in the value analysis, the degree of impact and value sequence of every stakeholder are quantified. However, the number may not be accurate as the range of number is too narrow. Therefore, the study in the future still has space to improve.

### **6.3 Further study**

Targeting at the limitations mentioned and improving the research quality, further study is recommended to promote:

- (1) Distribute as many questionnaires as possible to Self Employed Entrepreneurs (covers all industries, more locations); to Port laborers (covers all ages, more nationalities); to citizens (covers all ages, more occupations).
- (2) To interview management from HP, to confirm the real objectives, resources and values of HP to increase the reliability of the study.
- (3) Discuss of the feasibility of application of MANC mechanism under Chinese political circumstance. More investigations and research are needed.

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## Appendix 1. Record of Interview 【Yantian Port Group (YPG)】

【Translation version】 Record of interview      Date:2021-8-18

<b>Time</b>	2021/8/18 10am
<b>Approach</b>	Phone Interview
<b>Interviewer</b>	Chen Lei, senior manager of Yantian Port Group (YPG)
<b>Key questions</b>	<b>Answers</b>
<b>What is the motivation for your company to put forward Yantian port extension project?</b>	<p>We have two identities in this project:</p> <p>As a state-owned company, we are under the governance of the Shenzhen National asset commission (An important part of the Shenzhen government). In this sense, the chairman, presidents of our company are from the government, therefore, to fulfill governance responsibility is our priority. We represent authority and responsible for the management of the port. By the way, we wish to increase the harmony of the society. On the other hand, in principle, as a commercial organization we would like to earn increasing profit; But we are focusing on long-term profit, therefore, developing and enhancing the competitiveness of the port worldwide are also what we pursue.</p>
<b>What do your company think the stakeholder may be involved in this project?</b>	<p>Our company, HP and citizens. Citizen is a wide concept, may include many occupations, such as teachers, students and so on.</p>
<b>What is the decision-making process about this project?</b>	<p>See the Appendix 4. We signed a contract with Yantian port government (non-disclosure) that Yantian government entrust our company to exploit the Yantian port. We have a professional team to propose development plan, and the management of the company to decide whether to construct this project. And in this project, HP is entrusted to construct the project, all the details of construction are decided by it.</p>
<b>What are the objectives of this project?</b>	<p>Of course, in a short time, we hope that the project will have a lower cost, higher revenue and increasing profit</p> <p>From a long-term perspective, we wish to improve the performance of the port, increase the throughput, increase the number of businesses, the project would generate more taxes (for its authority identify) and more GDP. All of these will be achievements of our work and will contribute much for our future promotion.</p> <p>Thirdly, we wish to be more eco-friendly, the project would promote the transport infrastructure, would reduce energy consumption and bring more working opportunities.</p> <p>All in all, we focus on some key indexes of this project, which could reveal the performance of a port: they are higher throughput, number of tourists and businesses. Besides, we consider what this project will bring to the company. They are cost, revenue and profit. Finally, we would like to see the project have some positive impacts to the community, such as employment rate.</p>
<b>Could you evaluate the economic impacts of this project on your company?</b>	<p>Yes. But it may be my personal point of view, and may not represent the whole management.</p>
<b>A better port economy</b>	<p>The impact is positive and the influence level is Direct and substantial.</p>

<b>Increasing throughput of the port</b>	The impact is positive and the influence level is Direct and substantial.
<b>Better logistic system</b>	The impact is positive and the influence level is Direct and substantial.
<b>More income</b>	The impact is positive and we just benefit from the impact.
<b>Property loss due to the project</b>	The company indirectly and merely suffers from the impact.
<b>Could you evaluate the environmental impacts of this project on your company?</b>	/
<b>Construction waste</b>	The impact is positive and the influence level is indirect and slight.
<b>Water pollution</b>	The impact is positive and the influence level is indirect and slight.
<b>Natural ecosystem and landscape is destroyed</b>	The impact is positive and the influence level is indirect and slight.
<b>Air pollution</b>	The impact is positive and the influence level is indirect and slight.
<b>Noise pollution</b>	The impact is positive and the influence level is indirect and slight.
<b>Could you evaluate the social impacts of this project on your company?</b>	/
<b>Social issues related to employment rate</b>	The impact is positive and the company just benefits from the impact.
<b>Social issues related to pollution</b>	The impact is negative and the influence level is indirect and slight.
<b>Social issues related to restriction to natural resources</b>	The impact is negative and the influence level is indirect and slight.
<b>Social issues related to polarization between the poor and the rich</b>	The impact is negative and the influence level is indirect and slight.
<b>Social issues related to destruction of public security</b>	The impact is negative and the influence level is indirect and slight.
<b>From your objectives, we summarized your value, could you please confirm are all these your value?</b>  <b>Economically:</b> <ul style="list-style-type: none"> <li>● macro-economic growth</li> <li>● economic performance of the port</li> <li>● profitability (YPG's)</li> <li>● transport accessibility</li> </ul> <b>Socially:</b> <ul style="list-style-type: none"> <li>● social stability</li> <li>● employment</li> <li>● a responsible and international public image</li> </ul> <b>Environmentally:</b> <ul style="list-style-type: none"> <li>● an environmentally friendly public image</li> </ul>	Yes, your summary is correct. I agree with the values you summarized.
<b>Is there any supplementation of your value?</b>	No, I think it is complete.

**Could you please categorize the importance level of economic, environmental and social value?**

For us, under current "Economic centralized principle", Economic value is the priority (extremely important) and Environmental value and Social value are more or less the same, just relatively important.

## Appendix 2. Record of Interview 【China State Ship Building Company (CSSC)】

【Translation version】 Record of interview

Date:2021-9-03

<b>Time</b>	2021/9/3 10am
<b>Approach</b>	Phone Interview
<b>Interviewer</b>	Chen Jingyu, senior manager of CSSC
<b>Key questions</b>	<b>Answers</b>
<b>What is the motivation for your company to put forward Yantian port extension project?</b>	Even we are not HP and did not participate in Shenzhen Yantian project, but we are in the same industry as HP, and we can offer constructive views from the peer perspective. From the short-term perspective, profit and economic interest are the main motivation. From a middle term perspective, the port and the city are famous. To raise the reputation of the company as well as enhance its international business position are other motivations. From a long-term perspective, a positive public image is also important for the company. An environmentally friendly and social harmony figure are also motivations.
<b>What is the decision-making process about this project?</b>	I agree with the pic in Appendix 4. Under Chinese circumstance, YPG in this case is more like a port manager, which represents the authority, totally neutrally to govern all the parties rather than a commercial company focusing on earning money. And at execution level, due to lack of expertise, the decision maker is the HP. HP could offer consulting recommendations to them in influencing the decision.
<b>What are the objectives of this project?</b>	From my point of view, HP is totally a private international company. And in a short term, they must focus on their economic objectives most and they are cost, revenue and profit. From a relatively long-term perspective, I think they must care their public figure, want to have a positive image, which is to be more eco-friendly, provide more working opportunities to local communities and have more inter-cultural communication as an international company.
<b>Could you evaluate the economic impacts of this project on your company?</b>	Yes. But it may be my personal point of view, and may not that accurate. After all, HP has its own thoughts.
<b>A better port economy</b>	The impact is positive and is direct and substantial.
<b>Increasing throughput of the port</b>	The impact is positive and is just relatively, not substantial.
<b>A Better logistic system</b>	The impact is positive and is just relatively, not substantial.
<b>More income</b>	The impact is positive and is direct and substantial.
<b>Property loss due to the project</b>	As an international company, they would not suffer any.
<b>Could you evaluate the environmental impacts of this project on your company?</b>	/
<b>Construction waste</b>	The impact is positive and is just relatively, not substantial.
<b>Water pollution</b>	The impact is positive and is just relatively, not substantial.

<b>Natural ecosystem and landscape is destroyed</b>	The impact is positive and is just relatively, not substantial.
<b>Air pollution</b>	The impact is positive and is just relatively, not substantial.
<b>Noise pollution</b>	The impact is positive and is just relatively, not substantial.
<b>Could you evaluate the social impacts of this project on your company?</b>	/
<b>Social issues related to employment rate</b>	The impact is negative and is direct and substantial.
<b>Social issues related to pollution</b>	As an international company, they would not suffer any.
<b>Social issues related to restriction to natural resources</b>	As an international company, they would not suffer any.
<b>Social issues related to polarization between the poor and the rich</b>	As an international company, they would not suffer any.
<b>Social issues related to destruction of public security</b>	As an international company, they would not suffer any.
<b>From your objectives, we summarized your value, could you please confirm are all these your value?</b>  <b>Economically:</b> <ul style="list-style-type: none"> <li>● macro-economic growth</li> <li>● economic performance of the port</li> <li>● profitability (HP's)</li> <li>● transport accessibility</li> </ul> <b>Socially:</b> <ul style="list-style-type: none"> <li>● a responsible and international public image</li> </ul> <b>Environmentally:</b> an environmentally friendly public image	Yes, your deduction is reasonable. I agree with most of them.
<b>Is there any supplementation of your value?</b>	Emm, I think as a port construction and operation company, the promotion of port transport is also company's value.
<b>Could you please categorize the importance level of economic, environmental and social value?</b>	For us, Economic value is the priority (extremely important) and Environmental value is relatively more important than social value, places the second.

## Appendix 3-1. Questionnaires about Stakeholders' Objectives and Values

Questionnaires about Stakeholders' Objectives and Values are distributed by "WJX.cn" enterprise edition with regards to Port laborers, Self Employed Entrepreneurs and citizens. Questions are about two parts. The first part is about Economic, Environmental, and social objectives, which is to list the items and let each questionnaire respondent decide whether each one is an objective for himself/herself. The second part is about values evaluation. Each respondent is listed with the items and they could choose Degrees of importance, which are measured as 4-point scale: "Extremely important", "Relatively important", "Very important", "Not important".

Thus, this questionnaire about stakeholders' objectives and values is firstly to figure out objectives and secondly to figure out values and make a evaluation for each stakeholder when it comes to Shenzhen Yantian port extension project.

**关于盐田港项目各利益方目的评估的问卷**

\*1. 【第一部分：经济目标】以下关于盐田港扩建项目的描述，是否属于您的经济目标？

	是	否
更少的税收	<input type="radio"/>	<input type="radio"/>
更多的GDP	<input type="radio"/>	<input type="radio"/>
更低的成本	<input type="radio"/>	<input type="radio"/>
更多的收入	<input type="radio"/>	<input type="radio"/>
更多的利润	<input type="radio"/>	<input type="radio"/>
码头更大的吞吐量	<input type="radio"/>	<input type="radio"/>
更好的码头交通设施	<input type="radio"/>	<input type="radio"/>
更多的生意机会	<input type="radio"/>	<input type="radio"/>
更多的工业用地	<input type="radio"/>	<input type="radio"/>

\*2. 【第一部分：经济目标】请您补充以上未提及的您可能也看重的经济目标：

\*3. 【第一部分：环境目标】以下关于盐田港扩建项目的描述，是否属于您的环境目标？

	是	否
更好的空气质量	<input type="radio"/>	<input type="radio"/>
更好的水质	<input type="radio"/>	<input type="radio"/>
更加生态友好	<input type="radio"/>	<input type="radio"/>
更少的噪音	<input type="radio"/>	<input type="radio"/>
更少的废弃物垃圾	<input type="radio"/>	<input type="radio"/>
更少的能源消耗	<input type="radio"/>	<input type="radio"/>
更好的自然景观	<input type="radio"/>	<input type="radio"/>

\*4. 【第一部分：环境目标】请您补充以上未提及的您可能也看重的环境目标：

\*5. 【第一部分：社会目标】以下关于盐田港扩建项目的描述，是否属于您的社会目标？

	是	否
更好的社会福利	<input type="radio"/>	<input type="radio"/>
更好的社会治安	<input type="radio"/>	<input type="radio"/>
更高的就业率	<input type="radio"/>	<input type="radio"/>
更多的文化交流机会	<input type="radio"/>	<input type="radio"/>

\*6. 【第一部分：社会目标】请您补充以上未提及的您可能也看重的社会目标：

\*7. 【第二部分：经济价值】以下关于盐田港扩建项目的描述，是否属于您的社会目标？

	非常重要	比较重要	一般重要	无影响
宏观经济增长	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
港口经济增长	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
利润	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
生产效率	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
交通便捷性	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*8. 【第二部分：经济价值】请您补充以上未提及的您可能也看重的经济价值：



\*9. 【第二部分：环境价值】以下关于盐田港扩建项目的描述，是否属于您的社会目标？

	非常重要	比较重要	一般重要	无影响
环境舒适性	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
污染下降	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
能源消耗下降	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*10. 【第二部分：环境价值】请您补充以上未提及的您可能也看重的环境价值：

\*11. 【第二部分：社会价值】以下关于盐田港扩建项目的描述，是否属于您的社会目标？

	非常重要	比较重要	一般重要	无影响
社会稳定	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
健康	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
生活舒适性	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*12. 【第二部分：社会价值】请您补充以上未提及的您可能也看重的社会价值：

提交

## Appendix 3-2. Questionnaires about Stakeholders' Impact Assessment

Questionnaires about Stakeholders' Impact Assessment are distributed by "WJX.cn" enterprise edition with regards to Port laborers, Self Employed Entrepreneurs and citizens. Questions are about two parts. The first part is about Economic, Environmental, and social impacts, which is to list the impacts and determine level of each impact for each stakeholder. Degrees of impacts are measured as 7-point scale: "Direct and substantial benefit from the impact", "Benefit from the impact", "Indirect and merely benefit from the impact", "Not influenced by this impact", "Indirect and merely suffer from the impact", "Suffer from the impact", and "Direct and substantial suffer from the impact". The second part is about economic, environmental and social value ranks according to each stakeholder's preference for Shenzhen Yantian port extension project.

Thus, this questionnaire about stakeholders' impact assessment is firstly to assess impacts and secondly to figure out value ranks for each stakeholder when it comes to Shenzhen Yantian port extension project.

**关于盐田港项目经济、环境、社会影响评估的问卷**

**\*1. 【第一部分】 1、关于盐田港扩建项目的经济影响，对您的影响程度如何？**

	受到直接和实质性的正面影响	受到正面影响	受到间接的正面影响	不受影响	受到间接的负面影响	受到负面影响	受到直接和实质性的负面影响
港口经济改善	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
港口吞吐量提升	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
物流系统升级	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
经济收入增加	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
项目造成财产损失	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**\*2. 【第一部分】 2、关于盐田港扩建项目的环境影响，对您的影响程度如何？**

	受到直接和实质性的正面影响	受到正面影响	受到间接的正面影响	不受影响	受到间接的负面影响	受到负面影响	受到直接和实质性的负面影响
建筑废料污染	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
水污染	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
生态系统和自然景观被破坏	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
空气污染	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
噪音污染	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\*3. 【第一部分】3、关于盐田港扩建项目的社会影响，对您的影响程度如何？

	受到直接和实质性的正面影响	受到正面影响	受到间接的正面影响	不受影响	受到间接的负面影响	受到负面影响	受到直接和实质性的负面影响
与就业率相关的社会问题	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
与污染有关的社会问题	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
与自然资源限制有关的社会问题	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
与贫富两极分化相关的社会问题	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
与破坏公共安全相关的社会问题	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

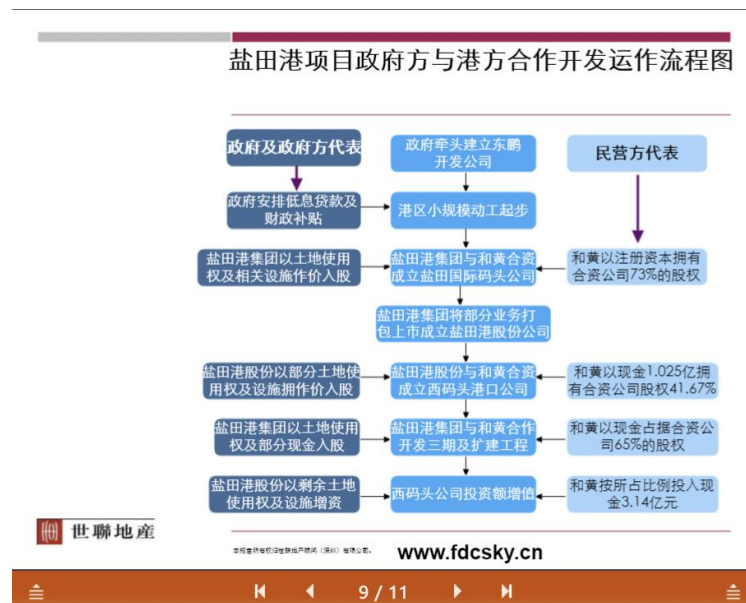
\*4. 【第二部分】1、列出您希望通过深圳盐田港扩建项目实现的经济、社会和环境目标和价值。（“目标”是价值表达的表面形式。）

\*5. 【第二部分】2、关于盐田港扩建项目，请对经济、环境、社会方面的综合价值进行选择。

	非常重要	比较重要	一般重要
经济价值	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
环境价值	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
社会价值	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

提交

## Appendix 4. Flow chat of the construction cooperation



During the interview of YPG, YPG offered the interviewer a slice of PPT, which illustrates the decision-making process in Shenzhen Yantian port extension project.

Simply say, the government entrusted YPG to operate the Yantian port and YPG is responsible for the development of the port. As YPG is a state-owned company, in principle, the asset of YPG belongs to the government as well.

Therefore, the proposal of this project, the feasibility analysis as well as other assessment such as EIA, SIA are all carried by YPG. In this sense, YPG is the representative of government and the decision maker of this project.

At implementation phase, the company who is responsible for construction is YICT. HP holds the 73% of the shares of YICT, and YPG holds the rest. Therefore, HP is the main shareholder of YICT, and is the stakeholder at implementation level.

## Appendix 5. Other Tables (Summary of Stakeholders' Value Impact Index)

Appendix Table.1 Summary of YPG's VII (Value Impact Index)

YPG Impact		Degree of impact	Value assignment	Value Impact Index
Economic value	A better port economy	3	3	9
	Increasing throughput of the port	3		9
	A Better logistic system	3		9
	More fiscal income	2		6
	Property loss due to the project	-1		-3
Environmental value	Construction waste	1	2	2
	Water pollution	1		2
	Natural ecosystem and landscape is destroyed	1		2
	Air pollution	1		2
	Noise pollution	1		2
Social value	Social issues related to employment rate	2	2	4
	Social issues related to pollution	-1		-2
	Social issues related to restriction to natural resources	-1		-2
	Social issues related to polarization between the poor and the rich	-1		-2
	Social issues related to destruction of public security	-1		-2

Appendix Table.2 Summary of HP's VII (Value Impact Index)

HP Impact		Degree of impact	Value assignment	Value Impact Index
Economic value	A better port economy	3	3	9
	Increasing throughput of the port	2		6
	A Better logistic system	2		6
	More fiscal income	3		9
	Property loss due to the project	0		0
Environmental value	Construction waste	2	2	4
	Water pollution	2		4
	Natural ecosystem and landscape is destroyed	2		4
	Air pollution	2		4
	Noise pollution	2		4
Social value	Social issues related to employment rate	-3	1	-3

	Social issues related to pollution	0		0
	Social issues related to restriction to natural resources	0		0
	Social issues related to polarization between the poor and the rich	0		0
	Social issues related to destruction of public security	0		0

Appendix Table.3 Summary of SEE's VII (Value Impact Index)

SEE Impact		Degree of impact	Value assignment	Value Impact Index
Economic value	A better port economy	2	3	6
	Increasing throughput of the port	3		9
	A Better logistic system	3		9
	More fiscal income	1		3
	Property loss due to the project	-3		-9
Environmental value	Construction waste	-2	1	-2
	Water pollution	-1		-1
	Natural ecosystem and landscape are destroyed	0		0
	Air pollution	-1		-1
	Noise pollution	0		0
Social value	Social issues related to employment rate	-3	2	-6
	Social issues related to pollution	-1		-2
	Social issues related to restriction to natural resources	-3		-6
	Social issues related to polarization between the poor and the rich	-2		-4
	Social issues related to destruction of public security	-1		-2

Appendix Table.4 Summary of PL's VII (Value Impact Index)

PL Impact		Degree of impact	Value assignment	Value Impact Index
Economic value	A better port economy	1	3	3
	Increasing throughput of the port	1		3
	A Better logistic system	1		3
	More fiscal income	1		3
	Property loss due to the project	-2		-6
Environmental value	Construction waste	-1	2	-2
	Water pollution	-3		-6
	Natural ecosystem and landscape are destroyed	-1		-2
	Air pollution	-3		-6
	Noise pollution	-3		-6

<b>Social value</b>	Social issues related to employment rate	3	2	6
	Social issues related to pollution	-3		-6
	Social issues related to restriction to natural resources	-2		-4
	Social issues related to polarization between the poor and the rich	-2		-4
	Social issues related to destruction of public security	-3		-6

Appendix Table.5 Summary of Citizens' VII (Value Impact Index)

<b>Citizens Impact</b>		<b>Degree of impact</b>	<b>Value assignment</b>	<b>Value Impact Index</b>
<b>Economic value</b>	A better port economy	1	1	1
	Increasing throughput of the port	-1		-1
	A Better logistic system	1		1
	More fiscal income	1		1
	Property loss due to the project	-1		-1
<b>Environmental value</b>	Construction waste	-2	3	-6
	Water pollution	-3		-9
	Natural ecosystem and landscape are destroyed	-2		-6
	Air pollution	-3		-9
	Noise pollution	-3		-9
<b>Social value</b>	Social issues related to employment rate	1	3	3
	Social issues related to pollution	-3		-9
	Social issues related to restriction to natural resources	-1		-3
	Social issues related to polarization between the poor and the rich	-1		-3
	Social issues related to destruction of public security	-3		-9