STRATEGIC MANAGEMENT MODEL FOR MEGAPROJECT SOCIAL RESPONSIBILITY IN SUPPLY CHAIN: THE CHINESE INTERNATIONAL CONTRACTOR PERSPECTIVE OPERATING IN THAILAND

ZIXUAN ZENG

A Thesis Submitted to the Graduate School of Naresuan University
in Partial Fulfillment of the Requirements
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By ZIXUAN ZENG

has been approved by the Graduate School as partial fulfillment of the requirements for the Doctor of Philosophy in Logistics and Supply Chain of Naresuan University

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Title STRATEGIC MANAGEMENT MODEL FOR MEGAPROJECT SOCIAL RESPONSIBILITY IN SUPPLY CHAIN: THE CHINESE INTERNATIONAL CONTRACTOR PERSPECTIVE OPERATING IN THAILAND

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ABSTRACT

Megaprojects are complex ventures, large-scale engineering facility that provide basic public services for social production, economic development, and people's livelihood, involving multiple stakeholders and having a profound impact of people and states, therefore, megaprojects are never just a magnified version of small projects. Substantial environmental and social problems are caused by construction projects. Early studies on megaproject social responsibility (MSR) were mainly limited to China's megaprojects, and most of the studies on satisfaction focused on the economic impacts, the policies impact, or only considered the primary stakeholders. Hence, based on stakeholder theory and cognition theory, this study explores the influential factors of MSR and enterprise internationalization on satisfaction of environmental compensation mechanism in the context of Thailand and puts forward corresponding conclusions and countermeasures. The questionnaire was administrated to respondents two times. The first dispatched to 204 respondents for pilot study and used to check the reliability, validity, and make sure all respondents could understand the questionnaire. The second questionnaire was distributed to 398 respondents as used for final analysis by using factor analysis, Pearson correlation

coefficients, multiple linear regression (MLR) etc. The results shown that the MSR positively affects the satisfaction of environmental compensation mechanism. Specifically, the stakeholder's social responsibilities of four stages of megaproject with corresponding were unveiled. It was found that two stages of MSR (design stage and operating stage) have significant and positive effect on satisfaction. The two sectors of cognition of internationalization (international attitude and perceived behavioral control) have significant and positive effect on satisfaction as well. Furthermore, the results also shown that the MSR will affect the degree of stakeholder participation in environmental activities, and the public's satisfaction with environmental compensation is positive related by the degree of stakeholder participation in environmental activities. This research is anticipated that investigating environmental compensation satisfaction model from the perspective of MSR would assist both international parties and policy makers, not only in Thailand but also other host countries, to better realize the formulation of sustainable development strategies and policies that meet the needs of the local public.

ACKNOWLEDGEMENTS

During my 3 years in Thailand, I went through a lot. 18th January 2019, my husband and I arrived Phitsanulok, a city of Thailand. Phitsanulok (PL) is a traditional city which means that rare people can speak English. Luckily, Sali and Aj Yue pick us up and we finally choose to live in Fuengfa Apartment, near 711, mono badu 4. The life in PL is extremely peaceful and cozy. Residents in PL have good characteristics and they were ready to help others. My husband and I have no ideas about Thai language at very beginning. One day, I was hungry and we decided to find some warm food, so we went to a retailer to buy warm noodle. But the retailer did not know English and the translator was bad to use. Therefore, we did not understand what the retailer talked about, so we just nod the head and take away. After home, I was so excited to say that: Wow, we can order food using Thai language! After my first try, I didn't want to eat anymore because it was so sweet, that's not my cup of tea seriously. Since then, I recorded every name of delicious food I ate in Pinyin on my memo and practice in free time. Until now, I could say many Thai food in Thai language.

I enjoyed my visiting scholar experience in Shanghai Jiao Tong University provided by my working place, Guangxi University of Finance and Economics. During that period, I attended classes with students from Antai College of Economics and Management from Monday to Friday, attended group meetings on time every week, and read books at home on weekends without slacking off. At the beginning, what the teacher teaching was so strange and difficult to me, such as multicollinearity, construct, coding, optimization, theoretical model, etc. I may not be able to fully understand the deep workings of these technologies yet, but I do understand the mechanics to some extent.

In NU, we always have class on Saturday and Sunday, from Monday to Friday, we mostly studied by ourselves. I finished my qualification exam on 5th June 2020, passed proposal defense on 28th September 2020, passed Cambridge English on 2nd November 2020, attended international conference on 14th December 2020, published the first paper on 30th December 2020 and the second paper on 21st October 2021 until today, graduation. I like NU classes very much, since each teacher has his or her own style of teaching; I like NU's library, since there is a room always leave for international

students; I like NU's ecosystem a lot, since there were plenty of wild animals there and trees shade the street; I like NU's environment a lot, since the rich cultural activities and comfortable exercising place; I like NU's massage faculty a lot, since I could get my favorite royal massage when I was tired…. All in all, I was privileged to enjoy all of these in NU.

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and gave me constructive suggestions.

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Thanks to my best friend, Ms. Lin Haimin, now is Dr. Lin Haimin, who extremely patient and continued to discuss and debate academical problems with me. Let's keep our promise and friendships remain and never can end.

Thanks to my so special friend Sali, Vittaya, Meay, Meixin, etc. When I was reading Thai documents, they helped me to translate into Chinese, even sometimes we need 3 persons to translate. When I think of that image, I am deeply moved. Maybe that's another reason why I love PL deeply inside.

Thanks to all the faculty staff who helped me during my research and paper work.

Thanks are also due to my husband also my colleague, Aj Shen Yongtao, who never failed to give me great encouragement, suggestions, and take care of my daily life in Thailand and China.

I would like to thank my family for their support all the way from the very beginning of my study. I am thankful to my parents and parent-in-law for their thoughtfulness and encouragement.

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CHAPTER I

INTRODUCTION

Introduction

Megaprojects are complex ventures, large-scale engineering facility that provide basic public services for social production, economic development, and people's livelihood (Flyvbjerg, & Molloy, 2011), involving multiple stakeholders and having a profound impact of people and states, therefore, megaprojects are never just a magnified versions version of small projects (Flyvbjerg, 2014). Sangkhamanee (2018) looks megaproject differently, the megaproject is a stable result of a mixing of time which requires a lot of effort to pay attention to people, machines, materials, finance, discipline and government cooperation. For example, information and communication technology, hydropower projects, all kinds of power plants, high-speed rail lines, expressway, hospitals, airports, large-scale signature architecture, long-span bridges, large-scale factories and the like. With the increasing number of megaprojects worldwide, the study of megaproject issues began to attract attention abroad in the 1990s and developed rapidly after 2000 and obtained important research results. However, the environmental problem increases rapidly, especially in developing countries.

In the mid of 2010s, S. X. Zeng et al. (2015) determined megaproject social responsibility (MSR) as "social responsibility of major infrastructure projects involves the policies and practices of the stakeholders participated through the whole project life-cycle that reflects responsibilities for the well-being of the wider society". Although this concept has not been put forward for a long time, a growing number of scholars start to pay attention to it. Since the deficiency, scattering, and regionalism of studies about the relationship of the fulfillment of MSR and satisfaction of environmental compensation mechanism (SECM) and rare studies about Chinese contractors play what kind of role in the fulfillment of MSR in the context of Thailand. Scholars are trying to define and scale the project as mega, giga, or tera with different project schedules and project costs, however, the projects are mega or not are only a relative concept. This research is the study to mainly demonstrates the

relationship between the fulfillment of MSR and the SECM through stakeholder environmental activities participation during project life-cycle (SEAP), and how does the cognition of internationalization (COI) affect the relationship between MSR and SECM in the context of Thailand. This research has important implications for future development between China and Thailand. At the very beginning of this research, an overview study of MSR globally is urgent need, it can illustrate the importance of the future of this study and calling for echoing.

Research Background

From the Thailand Board of Investment (BOI), Mr. Kobsak Pootrakool, Deputy Secretary-General to the Prime Minister and Secretary to Thailand's Council of Economic Ministers said that Thailand expects its ongoing investment in major infrastructure in the next five years (2020-2025) and announced, "Thailand Investment Ecosystem Update". The Ministry of Natural Resource and Environment (MNRE) of Thailand announced the 2015 to 2036 plan which mainly including three areas, alternative energy can replace traditional energy more than 30%, actively participate in projects to reduce energy consumption by 45% in the Asia-Pacific region and use alternative energy sources to produce 20 to 25 percent more fuel for transportation and reduce GHG emissions. Meanwhile, the Office of Cane and Sugar Board (OCSB), Ministry of Industry in Thailand, has issued the strategical plan of sugar industry from 2015 to 2026, increasing the sugarcane acreage from 1.7 million ha. to 2.6 million ha., sugarcane production from 106 million tons to 180 million tons, sugarcane yield from 66 to 71 tons/ha., and sugar production from 11.1 million tons to 20.4 million tons. The Thai sugarcane industry brought an income of more than 2,578 million USD to the country for sugar exportation and also important for the Thai rural economy with over 364,000 sugarcane farmers (S. H. Gheewala et al., 2019). The purposes are to match the increasing consumptions of sugar in ASEAN, to open more market even Thailand already exports 90% of the total sugar to Asia, and to follow Thailand 4.0 policy (Solomon et al., 2016).

About 110 countries are engaged in sugar production, and the top 10 countries account for 75% of the global output. Brazil, the European Union, Thailand, and China are the major sugar producers. In 2019, Thailand's sugar production

accounts for 7.42% and ranking fourth in the world. It is the second-largest exporter in the world after Brazil. Sugarcane is a significant economic crop in Thailand and the Thailand strategical geographic position brings potential advantages for the sugar industry especially for transportation. Nowadays, there are 56 sugar mills in Thailand with a total annual sugarcane production capacity of about 94 million tons located in Northern, Central, Eastern, and Northeastern regions with 13 factories, 18 factories, 5 factories, 20 factories, respectively (Office of Agricultural Economics Bangkok [OAE] 2018). From the perspective of the chemical action of sugarcane, not only to produce sugar but also the by-products called molasses and bagasse can be used to generate electricity to support the sugar mill daily operation and the extra electricity are going to sell to the local government (Chunhawong et al., 2018; S. Gheewala et al., 2016). Besides, the bagasse can be used to produce disposable goods such as cups and during the production, many other by-products need to be managed such as filter cake, wastewater, and ash from the steam and power generation and it is a good way to increase the core competency of bioenergy. However, the large-scale use of bioenergy also brings risks, for example, increasing the planting area of sugarcane will cause certain food problems, and the change of land use will lead to the change of greenhouse gas emissions, and the single planting will lead to soil degradation and the destruction of the ecosystem (S. H. Gheewala et al., 2011). The use of agrochemicals, fertilizers, and fuels together with the wastes and emissions during the production resulted in climate change, eutrophication, resource scarcity, etc. (Pongpat et al., 2017). Plenty of by-products produced from the sugarcane value chain such as cane wastes (green-cane), filter cake, waste water, and ash also bring environmental impacts. Moreover, the root cause of air contamination and soil degradation from the sugar industry is the burning of sugarcane waste during the harvest season. Hence, increasing number of studies are focusing on the areas of environmental management and proposing suggestions about environmental performance, sustainability, and socioeconomics (S. Gheewala et al., 2016; S. H. Gheewala et al., 2019; Prasara-A & Gheewala, 2016; Talang & Sirivithayapakorn, 2020).

A large number of megaprojects will launch shortly in Thailand, research on the MSR is a hot topic at the moment. Megaprojects can bring huge benefits like pulling effect on the economy, regional influence, employment, and disaster

protection, yet it can also bring drawbacks like environmental problems and socio-economic issues (He et al., 2019). Also, the PM2.5 has become a serious issue in Thailand. However, there are rare studies about MSR in Thailand, those related to MSR are environment (Chanchampee, 2010; Enters, 1995; Kofoworola, & Gheewala, 2009; Parnphumeesup, & Kerr, 2011; Srinavin & Mohamed, 2003; Sutthichaimethee et al., 2016), society (Molle, & Floch, 2008), economic (Assavavipapan, & Opasanon, 2016; Toor, & Ogunlana, 2008), stakeholder (Boonyabancha, 2005; Chompunth, 2012; Mayhew et al., 2008; Virakul et al., 2009), polity (Kumar, & Young, 1996; Molle et al., 2009), factions and corruption (Ockey, 1994), and ecology (Yeemin et al., 2006). Besides, most of the studies are talking about the Thailand CSR, a CSR checklist of corporate has been developed in several aspects: environment, energy, employee, community, and product dimensions the incentive forcing behind of CSR in Thailand are relative to the corporate financial performance (Jitaree, 2015), CEO leadership, and stakeholder's expectations (Virakul et al., 2009) which is distinctive with MSR. Meanwhile, with China's opening-up policy, how should the international strategies adopted by Chinese construction companies in the global market development when they compete with their counterparts in North America, Japan, and Europe? Scholars are no longer focusing only on economic benefits, but also on socioeconomical, environmental, and sustainability issues. Therefore, the EC has become a hot topic worldwide. EC is provided through resources payments but monetary, to protect, strengthen, recover, or other methods to improve similar resources, there are two types of perspectives of EC: biodiversity offsets and ecosystem service offsets. The previous one refers to the loss and gain of ecological functions, habitats, and species, the second one represents a more extensive goal in which human beings are included (Enetjärn et al., 2015). However, the ECM is a controversial topic since it may causes many negative effects (Lynham et al., 2017), thus, what will be the attitude of ECM from the perspective of public is an important concern that need to be investigated and unveiled when megaprojects will been launched in Thailand.

Research Questions

Based on the above research gaps of MSR and SECM studies in Thailand, this research will shed lights on these studies in Thailand through several dimensions from new perspectives. These will more on social impact bringing from megaprojects and how does MSR will affect the SECM, with recent period study, large sample size, and in the context of Thailand. Is there any correlation between MSR's influence on the SECM? Endless compensation of environment will cause certain economic issues, especially in developing countries with limited resources, and can lead to the subtle changes in the ecosystem with certain potential problems, such as animal feeding behavior changes, in the relationship between the fulfillment of MSR and the SECM, whether SEAP plays a mediator role and has a certain effect on them or not? What is the impact? And does COI adjust their relationship? In this research, these primary questions will be conducted into this research:

Main research questions:

1. What are the current behaviors and how to measure the MSR in Thailand?
2. What are the influencing factors affect the SECM?
3. How to improve the SECM?

Specific research questions:

1. In the view of the fulfillment of MSR (corresponding to main Q1)
   - 1.1 How many aspects of MSR?
   - 1.2 What are the manifestations of these aspects?
   - 1.3 What is the measurement of MSR?
   - 1.4 How to measure the fulfillment of MSR systematically and reasonably?
2. In the view of SEAP (corresponding to main Q1)
   - 2.1 What is SEAP?
   - 2.2 How to measure SEAP?
   - 2.3 What kind of activities during the project lifecycle?
   - 2.4 What's the participation frequency of different stakeholder?
3. In the view of the SECM (corresponding to main Q1)
   - 3.1 What are the environmental problems caused by megaproject?
   - 3.2 Who will responsible of SECM?

3.3 What's the importance of the SECM?

3.4 What is the SECM in the view of environmental problems caused by megaproject?

4 In the view of COI (corresponding to main Q1)

4.1 What are the factors that influence COI?

4.2 How to measure the COI?

5 In the process of the fulfillment of MSR, how to better promote the SECM through the moderation of COI, in turn, how does the SECM facilitate people for the sustainability of megaprojects? (corresponding to main Q2)

6 Is MSR in different stages related to stakeholder participation? (corresponding to main Q2, Hypothesis 2, H2)

7 Is stakeholder participation related to satisfaction with the compensation mechanism? (corresponding to main Q2, Hypothesis 3, H3)

8 Does stakeholder participation play a mediating role in the relationship between social responsibility and satisfaction? (corresponding to main Q2, Hypothesis 4, H4)

9 Is there a correlation between international perception and satisfaction with environmental compensation mechanism? (corresponding to main Q2, Hypothesis 5, H5)

10 Does international cognition have a moderating effect on satisfaction with social responsibility and environmental compensation mechanism? (corresponding to main Q2, Hypothesis 6, H6)

Research Objectives

The aim of this research is to improve the SECM by implementing MSR, and to verify the relationship between influencing factor of SECM and international MSR. To form a 'new ecology' SECM that integrates the environment and society and provide valuable practical suggestions for the government and people participating megaprojects.

The research objectives are shown below:

1. To investigate the social responsibilities in megaprojects in diverse project stages and stakeholder in Thailand.

Under this objective, the stakeholder theory will be applied to investigate the social responsibility for each stakeholders and the checklist of social responsibilities in megaprojects will develop according to previous studies of Lin et al. (2017) in the context of China and Jitaree (2015) in the context of Thailand, following by the site visit and in-deep interview.

2. To examine influencing factors that affecting the satisfaction of environmental compensation mechanism.

This study analyzes the relationship between the fulfillment of MSR and the SECM. The relationship between the fulfillment of MSR and the SECM are hypotheses as positive and significant, and specifically, different stages of MSR. The questionnaire survey will be applied after a pilot study, and the test of this study will use correlation analysis, regression analysis, etc.

3. To improve the satisfaction of environmental compensation mechanism.

Combining literature analysis and empirical research, explores the interpretation of social responsibility development in Thailand, provides support for the development of major engineering industry in the future, and provides the basis and suggestions for relevant governments and enterprises to formulate strategies.

Research Scope

Research content: firstly, a checklist to measure the MSR in the context of Thailand is carried out. Secondly, an examination of the relationship between the fulfillment of MSR and the SECM through a mediator of SEAP and one moderator COI is conducted. Other research contents are not included in this study.

Research respondents: in this research, the primary stakeholders are the central government, the local government, Chinese contractor or sub-contractor, media, community or public. Secondary stakeholders are designer, owner, supplier, project supervision, operator. Other subjects are not included in this study.

Research context: the performance of MSR in Thailand, the megaprojects include more than 10 sugar mills and power plants. Due to the limited research ability of the researcher, other projects like housing, shopping malls, and the like are excluded. Other research contexts are not included in this study.

Research methods: semi-structure interview, bibliometric, and questionnaire. Other research methods are not within the scope of this study.

Research tools: Citespace, Likert's 5-point scale, SPSS26, AMOS 26, and GraphPad Prism 9.0. Other research tools are not included in this study.

Research Hypotheses

According to the opinions above, the research hypotheses and framework as follow:

H1: MSR has a significant positive effect on SECM.

H1a: Initiating stage of MSR has a significant positive effect on SECM.

H1b: Design stage of MSR has a significant positive effect on SECM.

H1c: Construction stage of MSR has a significant positive effect on SECM.

H1d: Operation stage of MSR has a significant positive effect on SECM.

H2: There is a positive relationship between MSR and SEAP.

H2a: There is a positive relationship between the initiating stage of MSR and SEAP.

H2b: There is a positive relationship between the design stage of MSR and SEAP.

H2c: There is a positive relationship between the construction stage of MSR and SEAP.

H2d: There is a positive relationship between the operation stage of MSR and SEAP.

H3: There is a positive relationship between SEAP and SECM.

H4: SEAP mediates the effect of MSR and SECM.

H4a: SEAP mediates the effect of the initiating stage of MSR and SECM.

H4b: SEAP mediates the effect of the design stage of MSR and SECM.

H4c: SEAP mediates the effect of the construction stage of MSR and SECM.

H4d: SEAP mediates the effect of the operation stage of MSR and SECM.

H5: COI has a significant positive effect on SECM.

H5a: International Attitude aspect of COI has a significant positive effect on SECM.

H5b: Subjective Norm aspect of COI has a significant positive effect on SECM.

H5c: Perceived Behavioral Control aspect of COI has a significant positive effect on SECM.

H5d: Dual Cognitive aspect of COI has a significant positive effect on SECM.

H5e: Internationalization Behavior aspect of COI has a significant positive effect on SECM.

H5f: Internationalization Performance aspect of COI has a significant positive effect on SECM.

H6: COI moderate the effect of relationship between MSR and SECM.

H6a: COI moderate the effect of relationship between the initiating stage of MSR and SECM.

H6b: COI moderate the effect of relationship between the design stage of MSR and SECM.

H6c: COI moderate the effect of relationship between the construction stage of MSR and SECM.

H6d: COI moderate the effect of relationship between the operation stage of MSR and SECM.

Research Framework

The research framework is summarized according to the literature review and interview, every selected variable has corresponding theoretical and empirical support. After the systematical review, the research framework has been developed:

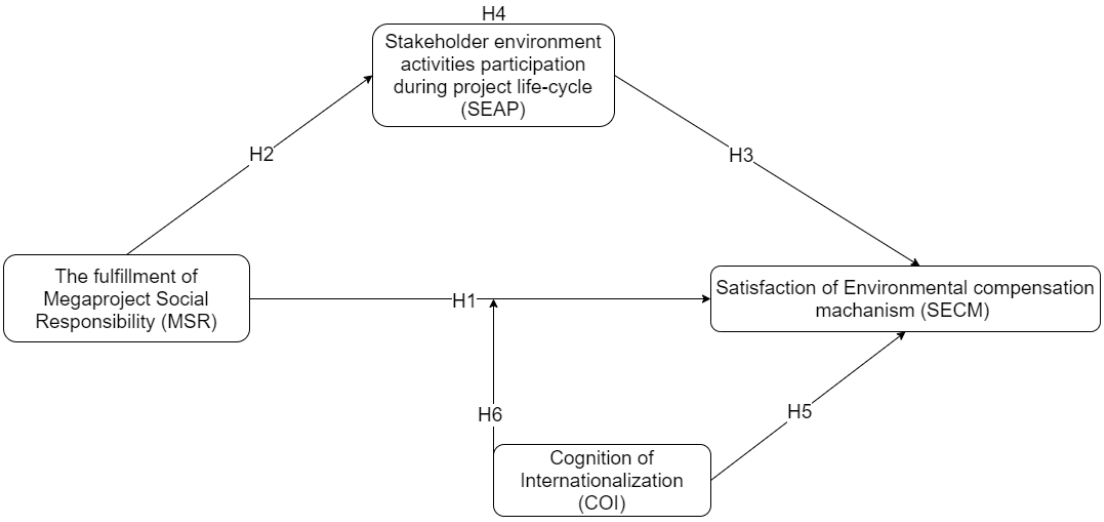


Figure 1 Research Framework

Research Significance

Theoretical Significance

Firstly, this research is contributed a further understanding of the fulfillment of MSR in developing countries and more specifically, in Thailand. Previous studies are focusing on the CSR in developed and developing countries, but the MSR is a new concept come up in 2015. Further, this study does integrate the MSR in Thailand with current practices and support the main objective of this study.

Secondly, this study is helpful to further improve the understanding of MSR, clarify the path and conditions of MSR affecting the satisfaction of environmental compensation mechanism, and provide theoretical basis and empirical evidence for the research in this field.

Thirdly, this study is expected to contribute in enhanced comprehending of management theories and further verifies the satisfaction from the theories of stakeholders, social responsibility and cognition.

Practical Significance

Fourthly, this study is also considered to be the first comprehensive examination of the relationship between the fulfillment of MSR and SECM which considering the stakeholder participation and cognition of internationalization in Thailand. This study is complementary to the development situation, and the consideration of Chinese contractors in the study makes a certain contribution to the future internationalization strategy.

Finally, this study is expected to establish a research field on MSR and SECM in Thailand. While the impact of the MSR have been examined in China, these characteristics could be different in the Thailand context. This research will illustrate a more distinct image regarding to the relationship of MSR and SECM and contribute a reasonable recommendation of improving the SECM for the future development of Thailand.

Abbreviation and Terminology

Megaproject social responsibility (MSR): *social responsibility of major infrastructure projects involves the policies and practices of the stakeholders participated through the whole project life-cycle that reflects responsibilities for the well-being of the wider society (S. X. Zeng et al., 2015).*

Satisfaction of Environmental compensation mechanism (SECM): *Satisfaction with the environmental compensation mechanism refers to the degree of psychological perception and preference of stakeholders for the comprehensive use of administrative means and market means by the government and enterprises to adjust the interest relationship between ecological environmental protection and construction-related parties. (Guihuan & Yihui, 2018).*

Stakeholder environmental activities participation during project life cycle (SEAP): *the degree to which stakeholders participate in environmental activities throughout the project lifecycle. In this research, the primary stakeholders are the central government, the local government, Chinese contractor or sub-contractor, media, community or public. Secondary stakeholders are designer, owner, supplier, project supervision, operator.*

Cognition of internationalization (COI): *Internationalization cognition refers to the judgment and understanding of enterprises or individuals on the mesoscopic environment and micro-conditions of domestic and foreign macro trends. Such cognition will be transformed into the management philosophy of enterprises and guide their specific behaviors and modes of internationalization development.*

CHAPTER II

LITERATURE REVIEW

Social Responsibility

In 1988, Merrovv (1988) took the lead in introducing the idea of social responsibility into large-scale engineering projects through the construction cost of large-scale engineering and the impact of manpower and material resources on society. The social responsibility of megaprojects is different from CSR. S. X. Zeng et al. (2015) proposed that *social responsibility of major infrastructure projects involves the policies and practices of the stakeholders participated through the whole project life-cycle that reflects responsibilities for the well-being of the wider society*, and identify the key issues of MSR into immigration settlement, pollution control, ecological protection, occupational health and safety, anti-corruption, disaster prevention and mitigation, and poverty eradication (H. Ma et al., 2019).

On the one hand, in MSR, there are multi-stakeholders with direct-internal-contractual stakeholders and indirect-external-public stakeholders of megaproject through the development of the project lifecycle, and each party played a distinctive level of social responsibility interactively, from the project lifecycle dimension to identify the involvement of stakeholders from initialization stage, plan and design stage, construction stage, and operation stage, also from the social responsibility perspective of economic responsibility, legal responsibility, ethical responsibility, and political responsibility (S. X. Zeng et al., 2015). On the other hand, H. Ma et al. (2017) argued that MSR is a complicated and "meta-system integration" issue, therefore MSR can never rely on a single party, yet CSR always relies on a single top manager or an organization (Davies & Mackenzie, 2014).

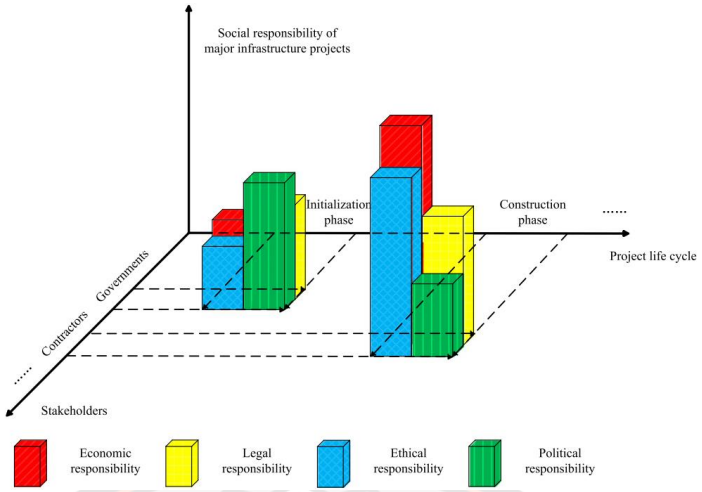


Figure 2 Three-dimension model of MIP-SR

Y. Yu et al. (2018) proposed a review study of social responsibility factors for public-private partnership (PPP), 38 social responsibility factors were proposed and classified by economic, environment, and community. The results have shown that the sustainability of PPPs is a very important issue to consider in the future. However, the indicators of the PPP-SR required further examination in future studies.

Y. J.-T. Zidane et al. (2013) proposed a study about megaprojects' challenges and lessons learned in the field of Norway and international megaprojects. Megaprojects can be likened as wild beasts since it can bring disasters. In contrast, it can also bring great prosperity and economic growth. The purpose of the research is to understand the characteristics of and the management of megaprojects. Secondly, the objective of megaprojects should not focus on time, cost, and quality only, megaproject diversity will be required now even in the future. Thirdly, this paper focuses on proprietors' changing demand. Suggestions are given how megaproject influenced by diverse owners, roles of project management in the megaproject, cultural difference, legislations and institutions, stakeholders, external and internal change management, risk, and opportunities management.

Lin et al. (2017) developed an indicator system for evaluating MSR with 25 indicators and 46 indicators with structured interviews and questionnaires at the organizational level and the project level respectively, through project life-cycle angle and stakeholder's perspective as S. X. Zeng et al. (2015) announced. The results also

provide a solution to balance the benefits of each stakeholder.

H. Ma et al. (2017) proposed the definition and features of MSR governance and a comprehensive framework based on “Business-Government-Society” (BGS) of social governance from the perspective of MSR. The result has shown that a mechanism is required to integrate the corporate, the government, and the public, not only for social governance but also for mutual benefits.

H. Ma et al. (2019) indicated that MSR has a positive effect on the construction industry sustainability, from the perspective of economic sustainability and social responsibility via a questionnaire survey. The results showed that MSR has a positive effect on the construction industry's sustainability from different perspectives on economic sustainability and social responsibility. To go even further, the relationship between those perspectives with MSR is weakened by primary stakeholders (such as design parties, contractors, subcontractors, suppliers, operators, and supervisors) and reinforced by secondary stakeholders (such as the government, public, NGOs, media, communities, the public, regulatory agencies).

He et al. (2019) demonstrated the relationship between MSR and project performance with a mediator factor innovation in a single integrative model. The results showed that there is a positive and significant effect between MSR and project performance, the higher innovation ability, the stronger relationship between MSR and project performance. More specifically, political responsibility has the strongest relationship with project performance when innovation ability is high.

Sheng et al. (2018) demonstrated that most of the megaprojects are initiated by the government and the public and as a result of profound impacts on people’s daily live and local economy. MSR can promote the development of related industries (H. Ma et al., 2019). MSR plays a helping role in the construction industry in order to the reduction of transaction costs and operational risks.

In conclusion, studies related to MSR are increasing nowadays, from the starting of define MSR to further researches regarding the deep level indicators in MSR are correlated with the influence of MSR and even dig out new factors to improve the performance level of MSR, as well as more related studies that are bound to emanate from MSR in the future.

1. Corporate Social Responsibility

Corporate Social Responsibility (CSR) was a hot topic of sustainability and social responsibility since the 1990s (Lin et al., 2015). One of the earliest and most cited definitions of CSR was Friedman's 1970 New York Times Magazine, he announced that the responsibility of managers is to maximize the interests of shareholders, any actions that relative to social benefit can be looked as an agency problem and do nothing but obey the law (Friedman, 1970). Such as, any social good behaviors from corporate managers can be viewed as a personal image improvement. Yet Davis (1973) challenged that obeying laws and regulations is the lowest requirement of a company, because it is what any good citizen should do, so it cannot be said that the company is socially responsible. Baron (2001) also proposed that "it is the motivation for the action that identifies socially, as opposed to privately responsible action". Carroll (1979) challenge Friedman by forming a framework between the relationship of social responsibility and corporate financial performance (a corporate social performance framework (CSP)). Freeman (2010) proposed a theory developed by Carroll that CSR is a valid role of management. After that, Donaldson and Preston (1995) introduced stewardship theory and announced from the moral perspective, managers should "do the right thing" whatever how these decisions affect the firm's financial performance. However, from the international view, consistency of "the right thing" is difficult. Jones (1995) apply institutional theory into CSR and illustrates that honest, trustworthy and ethical will bring high returns. Fombrun and Shanley (1990) state that CSR would be one part of the firm's strategy.

Based on the development of CSR into corporate strategy above, Wernerfelt (1984) and Barney (1991) through the lens of Resource-based View (RBV) to study how CSR affects firm performance. Reinhardt (1998) proposed that if firms can apply RBV into CSR and prevent competitors from copying their strategies, the firms will sustain an abnormal return and this finding also compatible with Barney (1991) VRIS (V: valuable, R: rare, I: inimitable, S: non-substitutable) method within RBV. However, in real life, firms cannot prevent the CSR-based strategy imitated by competitors, therefore the competitive advantage can only survive a short time. It is unclear how CSR report should be looks like according to stakeholders' expectation from the views of nations, regions, cultures, and institutional environment.

McWilliams et al. (1999) argued that firms have different stakeholders such as employees, customers, suppliers, other South African firms, and local communities. Snider et al. (2003) demonstrated that companies around the world have similar moves to promote and popularize CSR, and have strong homologous characteristics especially in the same industrial context (Silberhorn & Warren, 2007). As mentioned above, the previous academic research has carried on the rich and the systematic discussion to the CSR.

2. Megaproject Social Responsibility and Supply Chain

Carter and Jennings (2002) demonstrated the relationship between social responsibility on purchasing (PSR) and what will be influenced on supply chain through questionnaire survey. The results shown that PSR has a direct and positive impact on supplier performance, together with the improved trust and cooperation.

J. M. Cruz (2009) proposed a decision support framework model to analyze the relationship between supply chain networks and social responsibility, including the consideration of multicriteria decision-making behavior for different stakeholders. This model was able to should the interaction between each other and come up with an equilibrium pattern according to the context. The results shown that social responsibility will reduce the transaction costs, emissions, risks, and environmental impact potentially.

Zhu et al. (2018) proposed a contractor cooperation mechanism with a green supply chain in megaproject from the perspectives of the long construction schedule, multi-agent participation dynamics, and opportunistic behavior by using an evolutionary game model and biological dynamic evolution processes. The result shown that there must be an optimal distribution coefficient existed to allocate benefit distribution of the green behavior for the main contractor and subcontractor for long-term cooperation.

He et al. (2019) illustrated that MSR and innovation are important for the sustainability supply chain of the megaproject through questionnaire. And higher level of innovation ability will enhance the relationship between MSR and sustainability supply chain.

3. Conclusion

There are many studies on supply chain management and CSR, especially in purchasing and supply chain management (Quarshie et al., 2016), revenue sharing contract (Hsueh, 2014), global supply chain (Lindgreen et al., 2009), food supply chain (Hingley et al., 2013), risks (J. M. Cruz, 2013), etc. Speaking to the MSR, megaprojects are closely relative to rivers, oceans, forests, wild animals, and human beings (Levitt, 2007). Introducing MSR will enhance the sustainability of the whole construction industry (H. Ma et al., 2019), awareness of diverse stakeholders (J. M. Cruz, 2009), people's happiness (Jin et al., 2020) etc. Specific Example like the Dujiangyan Irrigation System and the Three Gorges Dam.

From the perspective of supply chain, MSR is the basis for the operation of supply chain. In the process of supply chain operation, the operation of enterprises in the supply chain depends very much on the impact of the megaproject on the environment, community, and society. Plenty of studies have been proved that CSR can serve a certain enterprise in the supply chain or upstream and downstream enterprises but rare studies on the MSR. Therefore, we could say that MSR is to create an environment for the sustainable development of enterprises in the whole supply chain. We could even say that MSR will be a thruster of the innovation of CSR and in turn, to create a new supply chain mode and contexts in the future.

Megaproject Social Responsibility in Diverse Dimensions

The characteristics of social responsibility of megaprojects are similar to the project itself which include a long schedule and huge amount of investment, impacts affected by megaprojects including multiple aspects of social responsibility (S. X. Zeng et al., 2015). In this part, several literatures and examples of demonstrating social responsibility will be reviewed.

1. Economic and Quality

Strengthening the construction of infrastructure and public facilities is the best promotion and development for national economic growth. However, if there are problems in the quality of the project or the maintenance is not in place, it will bring irreversible damage to the national and regional economy, environment, and people's livelihood, and it will take hundreds of years to compensate, such as the nuclear

leakage event. Therefore, the supervision of the project quality through the project life-cycle is crucial (Q. Wei et al., 2020) and on the other hand, Benavides-Velasco et al. (2014) proposed that integrate CSR and Total Quality Management (TQM) and they will promote the effect to the stakeholder and the intension of doing CSR, and Van der Wiele et al. (2001) illustrated how stakeholders are affected by TQM and CSR practices, and the performance of TQM will facilitate CSR activities.

Zheng, & Kahn (2013) proposed an early study of Chinese bullet-train (BT) has a robust positive effect between the market potential of urban growth and real estate prices. The economic geography model was applied to the study, together with instrumental variable (IVs) regression and OLS regression. The results have shown that BT facilitates the development of second- and third-tier cities that BT passed by, HP appreciation was introduced to demonstrate the importance of BT for Chinese city play an important role in integrating into the open urban system. The implications of this research, firstly, when the population density is high enough, the number of cities around the railway is large enough, and the cities themselves have serious traffic problems, it is the key factor that determines the cost-effectiveness of BTs. Secondly, infrastructure establishment in China will easier since the political structure is unique, especially the land is belonging to the state as a result of easier dispatching of resources whereas it is hardly achieved in Thailand because of the private ownership of land and frequent political changes.

From the perspective of a firm, X. Chen (2019) argued that corporates engineering project performance with disclosure of SR report is significantly higher than those without SR report disclosure. Moreover, the different properties of corporates (state-owned and non-state-owned) performed differently. The non-state-owned performance will higher than the state-owned performance of SR disclosure. In addition, the SR report disclosure has an urgent need for project performance at the moment. The result also showed that promoting SR will facilitate Chinese corporate development under the BRI states. However, types of non-state-owned are several, including joint venture, private, etc., how the performance of these kinds of companies still not clear.

From the perspective of the government, Besley and Ghatak (2007) put CSR and the traditional model of private provision public goods into a profit-maximizing corporate and compare CSR with government provision and charitable

provision of private for-profit companies. The result shown that CSR is not the way to solve standard problems of private provide public goods, the effect level of CSR is similar to the private voluntary contribution, and the reason for this phenomenon is because of the government. A perfect government would allow companies to ignore their external influences (Friedman, 1970). In other words, CSR could be a product of poor government performance.

Shenggen, & Zhang (2004) proposed that rural infrastructure and education is the main issue regarding rural nonfarm productivity than agricultural productivity. The high or low rural nonfarm productivity related to the investment of infrastructure, which means that the key is nonfarm productivity, such as the western region of China has lower economic performance than other regions, so that invest public capital and infrastructure in the western area is a way to improve economics.

2. Legal and Regulation

It is important to obey local law for the host country especially for international contractors. Before entering the foreign market, not being familiar with the local laws and regulations will not only cause serious economic consequences but also cause certain political consequences. Such as government default risk in Yemen, in 2006, Beijing Urban Construction Group with 100 million yuan lower than the local rival bid, win the Yemen's new international airport terminal project, the owner for the Yemeni civil aviation meteorological bureau, engineering price for $115 million in the project to start on April 1, 2006, the original plan to completed by September 30, 2008. However, during the construction process, the owner never pays according to the construction schedule, but Beijing Urban Construction Group keeps construction because they think the government will not break the contract. Finally, when the main structure almost is done, the decoration materials delivered to Yemen, the owner still not pay the funds, even $30 million performance guarantee of Chinese company completely deducted by Yemen, and the owner is disbursed millions of dollars in total. In Nigeria, the social responsibility of a company should be performed by law or not is a controversial issue. In England, the Queen's Bench Division is a defender for moral activities since it has the right to punish those who violate moral rules (Mordi et al., 2012).

Corruption is another important issue of megaproject (Kenny, 2009). Gillanders (2014) using the World Bank's Enterprise Survey data to examine the relationship between corruption and infrastructure, the result shown that the more corrupt the country, the worse the infrastructure, and the phenomenon is the same as in the regional area. If regional area corruption is more than the average corruption level of the country, the infrastructure situation will worse than the national level. Interestingly, the temporal effect would able to apply in this research such as lagging corruption. There is a famous case of renegotiation and corruption of infrastructure. The ODEBRECHT, the largest Brazil construction company in Latin America was fined by the US Department of Justice for $2.6 billion, they established a Division of Structured Operations (DSO) intends to make the bribe and profit as a whole and make the bribe untraceable. They renegotiate the small size project into a large size project but the bribe value only costs 1% of the original project cost, it's a kind of art of corruption with a large number of politicians and presidents (Campos et al., 2019).

3. Ethical and Environment

Ethical responsibility of megaprojects could be summarized into three issues, human rights, social charity, environmental protection (S. X. Zeng et al., 2015). In addition, the positive image of China's oversea megaproject also plays an important role in the path of internationalization (Shu, 2019).

Human rights will be classified by the inner and outer of the megaproject. Inner megaproject such as occupational health and safety (OHS), training of employees, salary, insurance. Outer megaproject refers to community safety, kind communication, and information disclosure. Social philanthropy refers to charitable activities such as build community facilities and donations for disabled or people in difficulty. Environmental protection means greenery consideration during the project lifecycle, safe natural resources, and proper disposal of pollutants.

Table 1 Ethical and Environmental responsibility

Concepts	Authors	Attributes	Outcomes
Human rights and Social philanthropy	Abubakari et al. (2020)	Outside megaproject	The implementation of social responsibility and benefit-sharing mechanisms will reduce the land conflict of involved communities.
	Ness (2010)	'Respect for People'	Discourse is a resource that is more easily used by the dominant group, the discourse of respect for people can also be adopted by organizations. Bias will always exist in any researches, but the critical discourse will provide different insights and help redress existing imbalances.
	van der Ploeg, & Vanclay (2017)	Inside and outside megaproject	Challenges faced by enterprises implementing respect for human rights on the site. A Human Right Sphere (HRS) was introduced to implementation. The HRS reports from three megaprojects indicate that company mitigation and compensation practices must be modified in order to prevent human rights abuses against laborers and communities. Personal documents are an excellent resource that can help multinational companies better reduce the adverse human rights impact of megaprojects.
Environmental protection	Castro et al. (2016)	Four case studies	From the perspective of corporate, community, and government interrelationships to LIMICs (Lower Middle-Income Countries) extractive industry or hydropower industry development, using four case studies to illustrate social responsibility issues about community health, the importance of community initiatives, the EIA systems.

Concepts	Authors	Attributes	Outcomes
	Lau et al. (2009)	Energy-saving, global warming	Compared to traditional buildings, low-energy cost building with green building features can reduce more than 55% energy consumption cost.
	Balaban, & de Oliveira (2017)	Green buildings, sustainability	Introduction of a green building not only improve the corporate social responsibility performance, but also shape the green cultural value of the organization, enhance the ability of technological innovation, accumulate the reputation of the industry, and establish the competitive advantage.
	Wang et al. (2017)	How MER affect OCBEs	MER (megaproject environmental responsibility), OCBEs (organizational citizenship behaviors for the environment). MER of internal stakeholders have a positive impact on their OCBEs but slightly impact with external stakeholders, those relationships are mediated by the environmental commitment of megaproject participants.
	Liu et al. (2018)	Safe natural resources, ecological compensation	Ecological compensation of Sousa Chinensis dolphin during the Hong Kong-Zhuhai-Macao Bridge.
Positive image	Shu (2019)	Secondary stakeholder especially	Because the reputation of the Chinese engineering enterprise is not matched with the hard force, the style of the "low-key work" of the Chinese engineering enterprise is not conducive to the maintenance of its reputation, and some of the stakeholders of the host country of the project also have the wrong interpretation of the Belt and Road Initiative and set up some bad corporate image. This research demonstrates that establishing a positive image of Chinese engineering enterprises through the entire

Concepts	Authors	Attributes	Outcomes
			process of the megaproject is a strategy of Chinese contractors goes global.

4. Political and Philanthropy

The term 'PCSR 2.0' was proposed for the new research area, the gaps for previous PCSR was discussed through an omitted lens: impact from nationalism and fundamentalism, the government rules, institutional environment, private governance, financialization and digitalization of the economy, and the meaning of management (Scherer et al., 2016). J. Wei et al. (2020) illustrated two types of PCSR for multinationals, they are public-serving and self-serving oriented, the former enhances the company's reputation, the latter discount the firm's reputation, and a negative interaction between each other. Luo (2006) illustrated the political behavior, social responsibility, and the perception of corruption for 126 sample multinational enterprises (MNEs) in China, the result has shown that when MNEs perceived the increase of corruption of business field, MNEs will decrease the intension with the government and lose the assertive dramatically, but they will more focus on ethical issues and decrease the attention in philanthropy. Based on this situation, MNEs will bargaining with the government by arm's length domination and take social relation to deal with the government instead of *guanxi*.

In other words, philanthropy behavior is something binding with the political, it can help to increase the firm's reputation efficiently. However, the responsibility of megaproject is far beyond PCSR, The characteristics of the community or living environment may affect health and may lead to racial discrimination or health inequalities, and the policy promotion of people's living environment can improve community well-being, poverty, communities happiness and stabilize the society (Diez Roux & Mair, 2010; Ludwig et al., 2012). Besides, the traffic jam caused by low performance of traffic and transportation system significantly affect the family mental health and the quality of life of normal people and inner-city drivers, which implicated that Division of Public Health and Division of Transportation should not only focus on relative policy making but also the implementation (Nadrian et al., 2019).

5. Conclusion

These four dimensions of social responsibilities are not independent, they have correlation and interaction between each other. For example, nowadays, in Angola, local communities, workers around mining areas, new models of local development and urbanization related to mining and new forms of political participation and debate are emerging, in the past, mining areas are belonging to a private company or the country controlled, employment of residents are rare which means that mining areas and local communities are independence to some extent. Therefore, the lower development of local livelihood is one of the issues because of lacking the mining area's social responsibility. The urbanization policies should introduce to solve this problem to find the balance of the mining area (Rodrigues, 2017). Moreover, van der Ploeg and Vanclay (2017) also illustrated the correlation between ethical and political responsibility. There must be many more examples like this, which proves the four dimensions of social responsibility echo or overlap between each other. In other words, deeply research of the interaction of diverse elements of social responsibility to such social phenomenon is urgent need. In this research, MSR will be measured according to these literatures and research context.

Environmental Compensation

Environmental compensation (EC) refers to provide positive environmental measures to redress the balance or otherwise compensate for the loss of environmental resources, such as in the construction of roads or industrial areas (Persson, 2013) and EC has many synonymous terms in the international literatures, such as offset, compensatory mitigation, restoration, and remedy. The essential connotation of ecological compensation is that the beneficiary of ecosystem service provides conditional payment behavior to the provider of environmental income service to achieve the goal of ecological environment protection by means of incentive or compensation (Jiawen et al., 2020). The earliest and the most popular way on environmental compensation could be *the compensation principle* in the 1970s in Germany (Peters, 1993). From the lens of the laws and regulations, environmental damage has two views, the first one is prejudice to private rights which means that the damage caused by man-made pollution to human health and property, such as noise

pollution from site noise to surrounding communities, the second is the adverse changes in environmental and biological factors, and those functional degeneration caused by the system collapse which formed by them, for example, the land degradation and desertification (Faure & Liu, 2011; Jing Wu & Chang, 2020). These kinds of problems are high public profile and failure to focus on improvement in this area could have irreversible consequences. Although regulations for environmental degradation have been introduced to solve those serious problems yet the activities are still lacking consistency and improvement. Therefore, the ECM needs to be investigated deeply and required innovation.

1. The State of Environmental Compensation

Environmental compensation was announced and regulated by Directive 79/409/EEC (European Economic Community) on 2nd April 1979 and Directive 92/43/EEC of 21st May 1992 for wild birds' conservation and wild fauna and flora conservation, respectively. The Convention on Biological Diversity (CBD) illustrates that "a common concern of humankind" is the main concept of CBD and at least 56 countries had made laws and regulations of compensation (Organization for Economic Co-operation and Development, OECD, 2014). The international term environmental/biological compensation mainly refers to restoration measures (Institute of Water Research and Hydropower Research, IWHR). The common measure term for environmental compensation is the Payments for Ecosystem services (PES) (Zbinden, & Lee, 2005) and the Polluter Pays Principle (PPP) whereas the PES intended to integrate the biophysical and environment protection from the perspective of social aspects (Daily et al., 2000). PES is a transaction between a supplier and buyer voluntarily to provide a continuous and secure supply through a clear ecosystem service, but in practice, a lot of PES cases failure to meet all the standard properly so called 'PES-like' cases (Suhardiman et al., 2013).

Countries all around the world have their environmental compensation mechanism, some scholars considered a very important "mechanism" is the Environmental Impact Assessment (EIA) but some find the definition of EC is provocative since considering EC as an exploitation of the natural resources on earth (Persson, 2013). EC is provided through resources payments but monetary, to protect, strengthen, recover, or other methods to improve similar resources, there are two

types of perspectives of EC: biodiversity offsets and ecosystem service offsets. The precious one refers to the loss and gain of ecological functions, habitats, and species, the second one represents a more extensive goal in which human beings are included (Enetjärn et al., 2015). The situation of EC in the Nordic countries is different. In Sweden, more than 3,500 ha of land have been conserved through compensation projects. In Norway, the first compensation project for highway has been planned which means that the compensation phase of Norway has beginning. In Finland, implementing the use of habitat banking for the future compensation credits is under researching since the weaker legal and law support. In Denmark, there are many successful cases informally but lack of formal compensation projects. In Iceland, certain kinds of projects are required for compensation, such as hydro power plant (Enetjärn et al., 2015).

The table below summarized the EC definition activities and measurements in several countries.

Table 2 EC definition activities and measurements in several countries

Countries	Citations	Activities of Environmental Compensation	Measures
Poland	Kwiatkowska-Malina (2016)	1. Protect plants, animals, fungi, and habitat 2. Reduce air, water, and soil pollution 3. Noise protection 4. Landscape protection 5. Local society protection	1. Restoration of habitat 2. New habitat created by developing new surface areas 3. The quality of remaining habitat area is improved proportionally according to the losses resulting from the investment 4. Protection the species that live in their habitat

Countries	Citations	Activities of Environmental Compensation	Measures
Germany	Rundcrantz, & Skärbäck (2003)	1. Fully restore the ecological function and rebuild the damaged function 2. Replacement of the ecological functions in an equivalent way	1. Minimizing impacts 2. Rectifying impacts 5. Reducing impacts
the USA (originated)	National Research Council	1. Restoration 2. Creation 3. Enhancement 3. For special case, reserve wetland to compensate natural wetland (in 1976)	1. Minimizing impacts 2. Rectifying impacts 3. Reducing impacts 3. Replacement of ecological functions
Netherlands	Cuperus et al. (2002)	1. Replacement of ecological functions 2. Partially replace the ecological functions 3. Compensation activities rigorous limited into nature acceptable range 4. Increase the existing ecological values 5. Through land acquisition to create habitat	1. Minimizing impacts 2. Rectifying impacts 4. Reducing impacts
the UK	Cowell (2000, 2003)	6. To correct, balance, and offset for environmental loss	1. Minimizing impacts 2. Rectifying impacts 3. Reducing impacts
China	Wenghua, & Moucheng (2010)	1. Return farmland to forests 2. Build or partially build habitat 3. Conservation project 7. Biological compensation (Water flow regulation of biodiversity conservation and carbon storage)	1. Clarity of property rights 2. Responsibility for implementation 3. Executive efficiency 4. Effectiveness 5. Sustainability 3. Equality

2. Environmental Compensation Mechanism

While the environmental systems have different characteristics, they are important, unique, and mysterious, embedding into this system appropriately will be an ongoing aim of every parties globally and EC is important since it is a mechanism to internalize the negative externalities of the environment (Shang et al., 2018).

The origination of ECM was in 1976 in America for wetlands, after that, the German Federal Nature Conservation Act that must keep the functions of the natural after a project finished (Shang et al., 2018). Cowell (1997) illustrated that ECM is not the ending of development of economic but an integration of the society operation and maintain the capacity of the environment to continuing provide benefits in harmony. ECM is as vital as technology, economic, culture, and supervision, and it has received the high attention from many stakeholders. Although the compensation is a valuable tool for decision makers, it should be applied in the context of the mitigation level, suggesting that environmental impacts should be avoided first, then minimized and eventually restored in a possible state. After these initial measures have been taken, any residual effects may be compensated in accordance with various proportional compensation methods (Enetjärn et al., 2015). Hence, the goal of ECM is to conserve natural resources, biodiversity, ecological functions, ecosystem services and other activities relative to ecological values (Shang et al., 2018).

Shang et al. (2018) illustrated the eco-compensation mechanism in China and compared theories and empirical studies in China and overseas. The results shown that the eco-compensation mechanism in China is an integration of ecological compensation and payments for ecosystem services and the mechanism in foreign mature countries are better than in China, the main reason for the poor performance is because of the excessive government participation. Since the income gap, the government must get involved again at this situation. Finally, choice of non-market valuation methods, property rights creation and market mechanisms are given as the suggestions of improvement of eco-compensation in China.

Table 3 The Mechanism Comparison between EC and PES

Backgrounds	EC	PES
Cause	Negative environmental externalities	Positive environmental externalities
Principle of payments	Polluter pays	Beneficiary pays, provider-gets
Driver	Regulation	Government-mediated payments or voluntary transaction
Implementation scope	Local, national	Local, national, international
Target	No net loss or net gain of ecological values	Sustainable supply of ecosystem services
Financing source (ideal)	Polluters	Beneficiaries
Financing source (real)	Mainly from polluters	Mainly from the government
Implementation method	One-off offsets, in-lieu fee, biobanking	Cash payment, in-kind payment

Source: Shang et al., 2018

Guihuan, & Yihui (2018) illustrated the innovation and reform direction of China's EC policy and proposed the new era EC would be diversification, systematization, marketization, and legalization, try to clarify the framework system of EC in China. Diversification: multiple participate in multiple ways of EC. Systematization: Integrated system compensation focusing on ecosystem types. Marketization: Give play to the role of market in the construction of long-term mechanism. Legalization: The successful model and long-term mechanism are fixed through regulations.

3. Environmental Management Studies in Thailand

In Thailand, the environmental problems and social impacts of plantations are serious obstacles. Demand for land resources and suspicion of monoculture by rural residents and environmentalists have limited the development of plantations. The economic benefits of reforestation far outweigh the financial benefits but affected by social and environment issues (Niskanen & Saastamoinen, 1996). As a result of the growing environmental problems, since 1981 Thailand has used the environmental impact assessment (EIA) process as an environmental planning and management tool

for the screening of economic development projects. The EIA has been used to determine the impact of projects and to identify appropriate mitigation measures for the effective use of natural resources for Thailand's economic development. Tools for EIA in Thailand include the Initial Environmental Examination (IEE), Environmental Impact Assessment (EIA), and Environmental Health Impact Assessment (EHIA).

Kunanuntakij et al. (2017) proposed a Green GDP model for Thailand by using EIO-LCA method and focusing on the GHG emissions. There are 80% GHG emissions are coming from manufacturing, power generation, transportation, and agriculture with 28%, 26%, 16%, and 15%, respectively. The Green GDP is the integration of each sectors' Green GDP and the difference between Thailand GDP and Green GDP is 2%, which means that the degradation cost because of the GHG emissions, and different departments' GDP have distinctive with the Green GDP, this proposed method could support the Thai policies and action plan.

Chunhabunyatip et al. (2018) illustrated natural resource management of indigenous people (Lua people) in Chiang Mai (Thailand) in order to propose proper policies and mechanisms for them by using an in-deep interview and regression method. The results shown that the beliefs in the Lower Songkhram River Basin supports them to protect the natural since they are connecting people and nature together traditionally and given property rights to them will better protect the natural resources. From the perspective of policy makers, involving into the local religion is a sustainable way to manage resources.

Panya et al. (2018) demonstrated the performance of the environmental management of local governments (EMLG) in Thailand by using questionnaires and SEM of 385 local governments. The results shown that there is a significant relationship between environment and outputs, but no significant relationship between the processes and outputs. The outputs are consisted with solid waste management, wastewater management, excreta management, pollution management, land use management, and water source management. Since the performance of EMLG played a moderate level, there are four suggestions are given by this study: build a sustainable culture, environmental learning organization, decrease costs and increase revenue, and precautionary environmental management.

Tevapitak, & Helmsing (2019) illustrated that the negative environmental impacts from the polluting companies are not affected by the local government, but from the interaction of stakeholders. To successful governance the water pollution cannot rely on the local government. The study focused on SMEs in Thailand and water pollution issues through in-deep interview and the results shown that there is no stakeholder have considerable contributions to the environment results, the responses of polluting companies are driven by the interaction between stakeholders which means that even though the local governments have the rights and power, they still cannot solve the negative environment problems. The future research point must focus on the stakeholder participation.

Faircloth et al. (2019) illustrated the environmental and economic impacts of photovoltage waste (solar panel) management in Thailand by using LCA method and PV waste flow projection method. The average life-span of solar panel is 20-30 years and the current plan to deal with the waste solar panel in Thailand is landfill. This study illustrated that the environmental impacts of recycling those waste solar panel will much lower than landfill. Wajeetongratana (2018) proposed the mechanism to promote the environment management from the perspective of the environmental accounting.

Prasara-A et al. (2019) illustrated the environmental, socioeconomic, and social problems to promote the sustainability of sugarcane industry. LCA and Social-LCA are applied into this study to assess the performance the industry from these three aspects. The results shown that sugarcane waste burning, and overuse of chemical fertilizers are the main causes of negative environmental performance, negative socioeconomic, and negative social performance. The sustainable suggestions of each stakeholders in the sugarcane industry are given, such as demonstration farms, zoning of products, and establishing laws and regulations of sugarcane waste burning.

4. Satisfaction of Environmental Compensation Mechanism

Frey et al. (2010) demonstrated that how individuals assess the environment comparing to countries that establish environmental policies to improve environmental quality and thus improving people's well-being. The report of the life satisfaction approach (LSA) approach was introduced to as a personal well-being experience subjectively. This review paper would like to illustrate that subjective well-being

satisfaction data is willing to assess public goods. There are two future aspects from this review. (1) the effect of personal income on satisfaction, and (2) the measurement of satisfaction.

Li et al. (2013) illustrated a systematical evaluating method of public participating in the whole project by using a fuzzy approach. Since the participation mechanism is dominating by the project owner. Standing up for ourselves is currently happened, hence, balancing the interests is a changing problem. This fuzzy approach is basically following three steps: (1) establish an indicator system, (2) ensure the responsibilities of diverse stakeholders, and (3) appropriate weighting for diverse stakeholders. Finally, a case study was applied in this indicator system with good corporation and a balance point has been investigated. However, the research is more on project aspect, modification is needed if another kind of evaluating requirement is launched.

Cai, & Yu (2018) presented the environmental compensation satisfaction of rural areas in the monetary or insurance compensation programs in 17 provinces of China. In order to assess the effectiveness of the policy, a questionnaire was conducted in 2012 and 2015 in Chengdu, Suzhou, and Shanghai. The results shown that rural people respond positive to the policy by time and the satisfaction level of different cities show differently. Farmers from Chengdu had higher satisfaction level than Suzhou and Shanghai. Discussion was given that the development of economics might influencing how farmers considering the compensation policy. Therefore, how to balance farmers from developing and developed regions is a challenging topic.

X. Huang et al. (2020) discussed how the compensation influencing people's satisfaction and housing situation in what influencing level and approach. The results shown that large amount of compensation funds can increase the satisfaction of relocatee.

Canova et al. (2019) demonstrated the transaction assessment of Payments for Ecosystem Service (PES) to ecosystem services (ESS) by investigating farmers from Rio Claro-SP from Brazil and highlands and lowlands of the UK. The results shown that both regions farmers would like to assess ESS by using opportunity costs. Hence, the opportunity costs will be an important indicator to apply PES but the budget from Brazil was limited. The experiences from the UK in PES shown that stakeholder participating in the initial and design stages of the PES plan is vital to

reduce the environmental trade-off. Therefore, as stakeholders in the participation of the policy is importance to optimize the balance between costs and effectiveness.

5. Conclusion

There are many researches demonstrated that PES is important but not all PES are customized for buyers and providers because of third parties included such as the government and investors, the system is flexible under market structure and proper supervision in order to better strengthen the natural resource control (Suhardiman et al., 2013). The integration of market-led and government-led of natural habitat restoration, resettlement mitigation, and PES is crucial issues (B. Yu & Xu, 2016). Furthermore, previous studies are focusing more on environmental management in different industries but innovation of the mechanism.

In this research, the scholar considered EC as an exploitation of nature rather than a part of EIA. When the project is implemented, the original 'old' ecology is broken. To establish a 'new' ecology, it is necessary to establish a 'new' ecology by means of environmental remediation. There might be many ways but there should always be a mechanism that including a government-led mechanism, or a multi-party cooperation mechanism based on the project effect and this is worth making clear. Therefore, ECM and EC are different. Moreover, EC plays a vital role in social equitable conservation especially in the promotion of community benefits (Verde Selva et al., 2019). Although environmental management is a part of social responsibility, the mechanism needs to be constantly improved because conflicts (Cowell, 1997) and risks (Levrel et al., 2017) are still exist during the implementation of ECM.

Stakeholder Theory

Stakeholder Theory is *a view of capitalism that stresses the interconnected relationships between a business and its customers, suppliers, employees, investors, communities and others who have a stake in the organization. The theory argues that a firm should create value for all stakeholders, not just shareholders*. It has been widely accepted but its basic aspects are still uncertain since stakeholders have generated different definitions for different purposes (Freeman, 2010) and there are 885 stakeholder theory definitions established by scholars (Miles, 2017).

1. The State of the Art

The germ of stakeholder theory emerged from the debate on corporate social responsibility by Davis (1973), in particular, it is emphasized that the interests of shareholders should not be the only perspective of think about the problem. Since then, a heated discussion has begun in the academic world. Academic research on stakeholder theory first appeared in the field of strategic management (Clarkson, 1995), then expanded to the organizational theory (Donaldson & Preston, 1995; Rowley, 1997), business area (Parmar et al., 2010), the field of social responsibility (Aguinis & Glavas, 2012), and sustainability (Perrini, & Tencati, 2006; Sharma, & Henriques, 2005). Recently, an increasing number of researches began in the innovation area (Ayuso et al., 2011; Weng et al., 2015). From a theoretical point of view, the concept of four influential theorists and briefly demonstrate their standpoints with stakeholder theory, as the table 4is shown below.

Table 4 The concept of four theorists with stakeholder theory

Theorists	Concept	Links to stakeholders
Friedman (1970)	Maximize the value of the market and shareholders	Safeguarding the interests of stakeholders is not social responsibility, but capitalism. Stakeholder theory is a management tool for business and value creation. The only way to maximize the value of shareholders is to meet the interests of stakeholders.
Jensen (2002)	Agent's business	A value maximization function was proposed by putting those good or bad effect factors of the company into a function and combine stakeholder theory with the function to achieve value maximization.
Porter (1997); Porter and Kramer (2006, 2019)	A competitive enterprise and consider CSR and sustainability into a superior resource strategy	"Bargaining power of customers and suppliers" is a key power and admitted stakeholder theory even Porter et al. are more focusing on industry and competitive advantage

Theorists	Concept	Links to stakeholders
Williamson (1989, 2010)	Save transaction costs	To analyze the relationship between specific stakeholders, it is necessary to establish a network of stakeholders if the theory of stakeholders is turned to the practice

Source: Parmar et al., 2010

2. Stakeholder Theory and Megaprojects

Stakeholder theory is regarded as one of the most influential theories in megaproject management. There are many kinds of application and depth of stakeholder theory into megaproject. Such as stakeholder satisfaction, stakeholder interaction, stakeholder participation, stakeholder engagement, stakeholder behavior, and stakeholder perception, etc. in the megaproject. Moreover, the stakeholder also divided into primary-contractual-internal stakeholder and secondary-noncontractual-external stakeholders (S. X. Zeng et al., 2015).

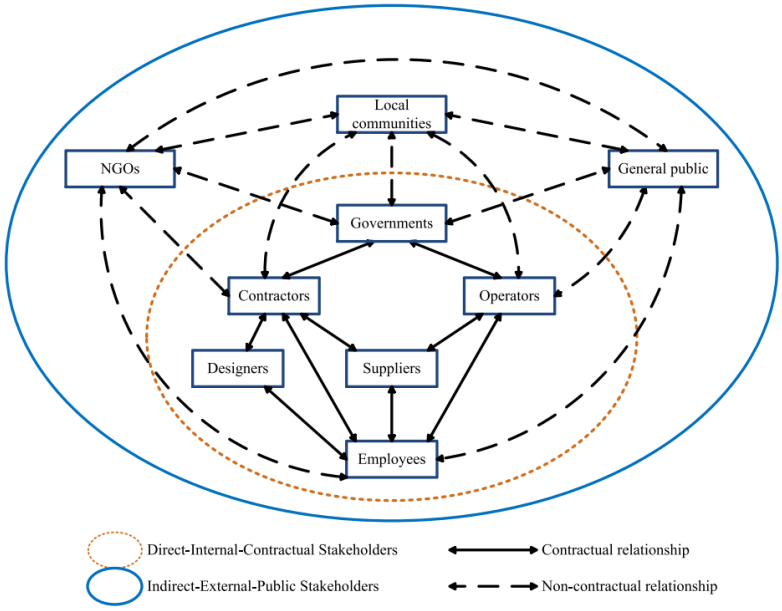


Figure 3 Relationships of Stakeholder in Megaprojects

Y. J. Zidane et al. (2015) proposed a model of stakeholder mapping that aligns with the power and interest matrix. There are five measures are included: effectiveness, relevance, impact, sustainability, and efficiency. The results have shown that the early involvement of internal and external stakeholders will positively for the management yet identify the key stakeholders who contribute impact of the initial level of the project is important. Moreover, communicate with external stakeholders is good but speaking of how to balance the limited resources of stakeholders is still a problem.

Di Maddaloni, & Davis (2017) reconsidered the influence of secondary stakeholders, the local community to megaproject by using a systematic literature review, the output has shown that asking for opinions from the local community will increase the performance of megaproject. Further research has been down by Di Maddaloni and Davis (2018) using thematic and cluster method illustrated how the primary stakeholder (project manager) perceived the requirements of secondary stakeholder (local community) and if project manager knew those needs, a more extensive comprehensiveness for the local community is required.

Bahadorestani et al. (2020) proposed a novel approach of how to balance the mutual value creation of megaproject and stakeholder since the success of a megaproject is to create value and satisfaction through a balanced way. Finally, three types of stakeholders were proposed through DEA: modest, fair, and demanding.

Romestant (2019) announced a concept of the sustainability of megaproject is an agency by the stakeholder involvement. Stakeholders were classified into promotors, translators, and targets, the purposes of this research are to produce a dynamic aspect of stakeholders and a sustainable development of the project-centered business market.

Barabaschi (2020) emphasized the properties of different kinds of stakeholders and the role of the stakeholder engagement in megaproject together with the socially responsible model to demonstrate the difficulties of the social responsibility governance of megaproject.

L. Wu et al. (2019) examined the effectiveness of public participation in the success of megaproject through game theory and social utility equations. The results have shown that the high effectiveness of public participation required a

responsible behavior between stakeholders, which means that a perfect institutional arrangement of stakeholders is urgent needs.

Dyer (2017) proposed a conceptual framework of the potential relevance of megaproject implementation and cultural sense-making social responsibility relative risks inside the megaproject by using the problematization method. The result illustrates that stakeholders who understand socio-cultural knowledge would reduce the stereotyped image and pay more attention to the project risks which have a high relationship with the megaproject successful implementation. The establishment of cultural sense-making is to inform managers to better understand the instinct of how tasks correlated. The exclusionary of stakeholders will cause megaproject to fail, and the risk decision-making framework establishment mostly based on short-term cultural contact. Therefore, the new conceptual framework of the cultural sense-making concept embedded in the traditional risk model was established.

Xue, Shen, Yang, Zafar, & Ekanayake (2020) proposed a stakeholder conflict management model of a case study of a 16 years duration Hong Kong-Zhuhai-Macao Bridge. Five stakeholder groups of local industry, green group, project supervision, construction group, and government were considered and three types of conflict ranking according to the project period were illustrated: environmental conflicts, neighboring conflicts, and project time, cost, quality conflicts. Finally, the Mirror Z strategies of each project phase were proposed to deal with management problems that occurred between stakeholders and conflicts. Besides, another research by Xue, Shen, Yang, Zafar, Ekanayake, et al. (2020) examined how do formal and informal stakeholder relationships will affect the better performance of megaproject from the internal organizational stage to project and social stage. The result showed that project cost, time, and employee protection mostly affected by formal stakeholders whereas communication and transparency issues are more on informal stakeholders. Environmental issues, OHS (health and safety), and adjustment are mainly related to formal stakeholders.

3. Stakeholder Participation

Participation in social management and equal exercise of political rights is an important feature of a democratic society. The participation of citizens makes the society full of vigor and vitality (De Tocqueville, 1988) and the involvement and all

stakeholder participation is the key to be sustainability especially in the countries with limited resources since there is a huge economical consumed chain behind the waste management (Joseph, 2006). Deverka et al. (2012) established an effective engagement framework with clear classifications of the groups of stakeholders and stakeholder participation in comparative effectiveness research of cancer genomics.

Brody (2003) examined the relationship between the stakeholder representation and participation and ecosystem management strategies with relative control variables to isolate the effects of environmental factors. The results have shown that the existence of specific stakeholders considerably increases the ecosystem management strategy's quality and a wide range of stakeholder representatives may produce a negative effect. The finding is important since environmental-consuming industries prefer to concern environment management as a result of a strong plan and they realized that the way to keep economically sustainable is to manage environmental sustainability, these kinds of activities to conserve environment will build a positive corporate image to the media and public, and the transparency of data and information will promote the commercial operations. However, it is important to examine which kind of condition will have the greatest impact on the quality plan.

Reed (2008) systematically reviewed the stakeholder participation in environmental management. At first, the way of participation under distinctive subjects and contexts was reviewed, secondly, investigated the benefits and drawbacks of stakeholder participation. Thirdly, demonstrated different view of form and degree of stakeholder participation. Finally, summarized that there is a need to quantitatively measure stakeholder participation and more work on the investigation of the potential attitude of stakeholders.

Le Pira et al. (2016) built an agent-based simulation model to simulate the multistate opinion dynamics and came up with a stakeholder interaction imaging figure by using a parking management strategy in a university. The result has shown that the participation of stakeholders will better promote the arrangement and repetitive communication of stakeholders contribute to reducing conflicts.

Ommen et al. (2016) investigated how stakeholder participation will affect flood risk management in the context of the UK and Germany from the perspective of flood defense planning and policy implementation. The results have shown that consideration of local stakeholder only is not enough, it will cause conflicts and inequalities.

Luyet et al. (2012) proposed a framework (Figure 4) for stakeholders to get into environmental projects from the recognition to the evaluation. There are six steps to evaluate stakeholders including identification, characterization, degree of involvement definition, choice of participatory techniques, implementation of participatory techniques, and finally, evaluation. The technique of each step of the framework was proposed and apply the framework into a case study in Switzerland.

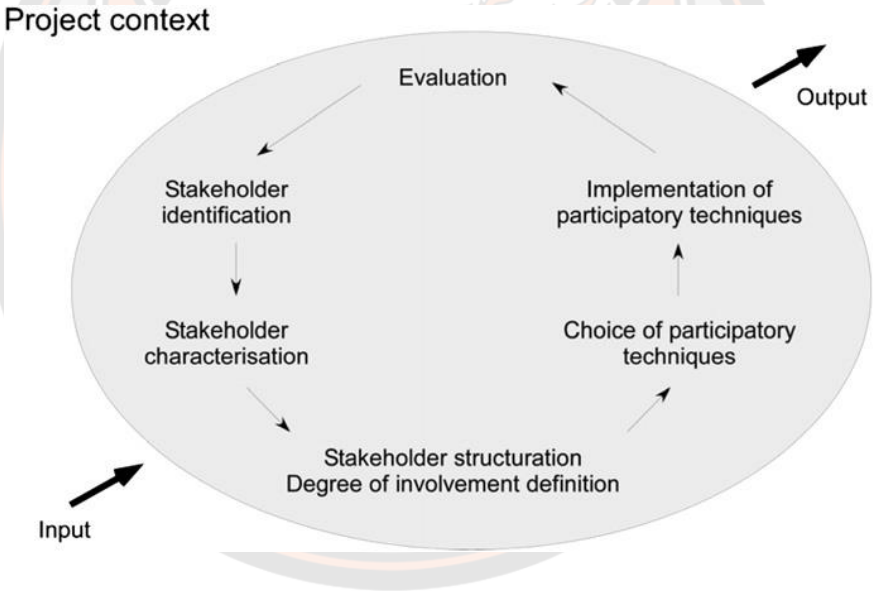


Figure 4 The stakeholder participation framework

H. Ma et al. (2021) demonstrate the effect of MSR to the performance of participating organizations in the context of China. The empirical result shown that there is a positive significance of MSR to the financial and social performance of participants. In addition, the primary stakeholders have negative effect and secondary stakeholder have positive effect of MSR to participating organizations' performance.

In conclusion, the concept and implementation of stakeholder participation have been used in different areas, ecosystem, natural disasters (Aldunce et al., 2016), zone planning (Buanes et al., 2005), service innovation process (Ommen et al., 2016), policy (Challies et al., 2017), etc. However, it is important to mention that appropriate participation is very important, if the ecological system between different system sudden and dramatic change, when the ecological system from one system to another system, a complete set of available ecosystem interests will change and affecting the stakeholders who rely on the ecosystem, such as the otter-kelp dynamics in North Pacific Ocean and gulf of Maine lobster fishery, eventually leading to economic loss and ecological damage because of the costly stakeholder participation (Lynham et al., 2017).

4. Conclusion

Stakeholder theory has been applied to several areas and is divided into different properties through external or internal, contractual or non-contractual, direct or indirect, primary or secondary, formal or informal, etc. Every scholar has their grouping criteria cognization, it will be a trusty way to apply stakeholder theory as long as with the supplementary of theory and the actual situation. According to this research content and the situation in Thailand, this research will integrate the concept and method through literature and stakeholders in megaproject will be classified into two groups they are: primary stakeholders and secondary stakeholders with explanations and participants as shown in Table 5.

Table 5 Research Stakeholder

Types of stakeholders in this research	Attributes	Parties
Primary stakeholders	External and ethical relationship with the megaproject	The central government, the local government, Chinese contractor or sub-contractor, media, community or public.
Secondary stakeholders	Internal and contractual relationship within the megaproject	Secondary stakeholders are designer, owner, supplier, project supervision, operator.

Internationalization of Enterprises

The internationalization of enterprises refers to *an objective phenomenon and development process of an enterprise whose production and operation activities are not limited to one country but facing the world economic stage* (Pearce, 1989). There are almost six aspects of enterprise internationalization which includes management internationalization, production internationalization, sales internationalization, financing internationalization, service internationalization, and talent internationalization, those aspects are not isolated when they come to the realistic. With the continuous progress of internationalization, the demand and pressure of social responsibility faced by contractors increase significantly (Kang, 2013). These requirements and demands are coming from the heterogeneity and diversity, different demand of stakeholders (Yang & Rivers, 2009), laws and regulations (Acs et al., 1997), technology (Papanastassiou et al., 2019; Jie Wu et al., 2016), marketing, experiences of entrepreneurs (Roy et al., 2016; Wright et al., 2007), types of enterprises (Benito et al., 2016; R. Zeng et al., 2012), and society. MNCs must build their competitive advantages from antecedents' studies.

1. International Enterprise Globalization Strategy

With the increasing pace of Chinese contractors "going global" in recent years, the decision and behavior of contractors' social responsibility are influenced by the international market and international strategy. Faced with the unfamiliar institutional environment and stakeholder networks in overseas markets, international contractors need a series of localized practices to obtain legitimacy, which is usually closely related to social responsibility (Yang, & Rivers, 2009).

The definition of strategic management is that a dynamic management process in which an enterprise determines its mission, sets its strategic objectives according to the external environment and internal conditions of the organization, makes plans to ensure the correct implementation and realization of the objectives, and puts such plans and decisions into practice by relying on the internal capabilities of the enterprise, as well as controls during the implementation process (Rumelt et al., 1991; Steiner, 2010). A comprehensive view of enterprise strategy, the famous 5P model, from the view of enterprise's future development, strategic performance is a kind of Plan, and from the view of enterprise development in the past, strategy is

characterized by a Pattern, if from the point of the level of industry, strategic performance is characterized by a Position, while level from the enterprise strategic performance is a kind of Perspective. In addition, Strategy is also a kind of Ploy adopted by enterprises in competition (Mintzberg, 1987).

Alon et al. (2018) reviewed the studies of the internationalization of Chinese contractors (ICE) by using bibliometrics from 2003 to 2016. There are four research areas: traditional foreign direct investment (FDI) theory examination, selection of location, selection of entry mode, and internationalization motivations. The internationalization framework of ICE was proposed as shown below and the future research areas were proposed, greenfield investment, investigate tax havens as a location selection method, how the ICE performance will affect ICE from short term, medium-term, and long term, and compare the example of Chinese ICE and competitors underdeveloped market.

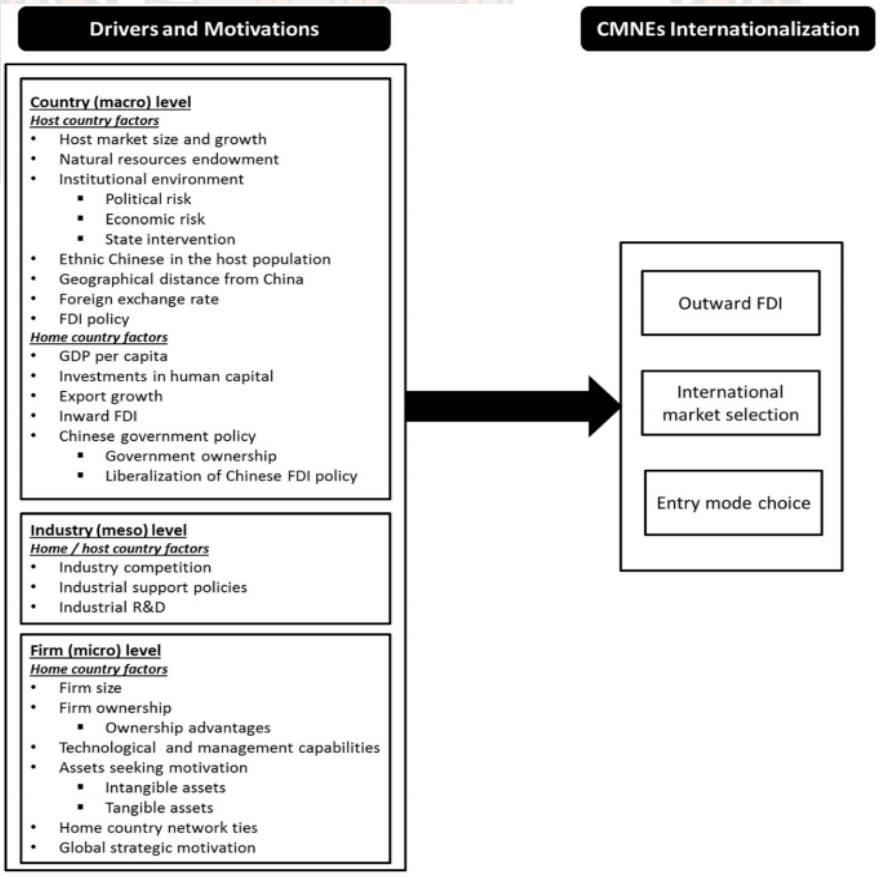


Figure 5 Framework of Chinese Multinational Enterprises Internationalization Path

Kang (2013) illustrated the relationship between diversification and corporate social performance (CSP) by using the regression model. The results have shown that there is a positive relationship between diversification and CSP, when the corporate is more focusing on short term benefits, the results will cause the dissatisfaction of stakeholders and weaken the investment in the social problems, thus negatively moderating the relationship between diversification and CSP.

2. Degree of Internationalization

Degree of internationalization (DOI) is *a strategy through which a firm expands the sales of its goods or services across the borders of global regions and countries into different geographic locations or markets (Hitt et al., 2006).* H. Ma et al. (2016) studied the international diversification and CSR of Chinese contractors listed in ENR between 2010 to 2014, the research found out that firstly, the degree of internationalization (DOI) has a positive relationship with CSR score. Secondly, the study found that geographic diversification (GD) has a negative effect on the score of CSR and DOI. Thirdly, project diversification (PD) has a positive effect directly to CSR scores. This study applied foreign revenue as a percentage of total revenue (FRTR) (Qian et al., 2008) to measure the Chinese contractor's DOI, and the results have shown that the higher social responsibility score is, the higher the level of DOI. This research expends the literature on the impact of international diversification on CSR, proposed the advice for contractors of emerging countries "go global".

Sui Pheng, & Hongbin (2003) explored that the traditional multinational theory is not able to explain the internationalization of Chinese contractors in the list of Engineering New Records (ENR) and fulfill the knowledge of 35 Chinese contractors' performance by using international revenue/total revenue, international business distribution, overseas management structure, involvement in a specialized field, and an overall index of internationalization, finally came up with a DOI of Chinese international contractor enterprises.

3. Transnational Index

Transnational Index (TNI), also referred to as the "Trans-nationalization index" for transnational corporate (TNC), refers to *the degree of internationalization in which a company's overseas activities account for all its business activities, which is a measure of how Transnational a company is.*

Each year the United Nations Commission on Trade and Development (UNCTAD) ranks the world's 100 biggest multinationals by their total foreign assets and their multinationalisation. When evaluating the internationalization level of traditional transnational corporations, the most common criteria are composed of two index systems. First, the overseas operation index system, including overseas turnover index, overseas purchasing and production index, overseas direct investment index, overseas technology transfer index and other major quantitative evaluation indicators; The second is the international development index system of management functions, including the coordination of strategy and decision-making of transnational corporations, the adaptability of local markets, the situation of employing foreign managers, the control force in financial management and other main qualitative evaluation indexes (Gerybadze & Reger, 1999; Ietto-Gillies, 2012). Accordingly, the United Nations has established a methodology for calculating the transnationalization index. The formula is following:

Transnational index = foreign assets/total assets + foreign sales/total sales + foreign employees/total employees ÷3×100%

Transnational corporations in countries with small domestic market size must take external market expansion as one of their main goals and usually have greater motivation to carry out international expansion. At the same time, the degree of transnational corporations in different industries varies greatly, and some industries have very high degree of transnational operation. For example, the food and beverage industry have a higher degree of transnational index. In today's economic globalization, the transnational index of multinational companies is constantly improving (Bartley, 2018). The proportion of overseas capital, overseas sales and overseas employees of some multinational companies even exceeds its domestic part. When a company's main income and main assets are all from overseas, more than half of its employees are employed overseas, and its management focus is overseas, its thinking mode and business model will be greatly different from that of ordinary multinational companies, and it will gradually transform to a global company (Baum et al., 2016; Ietto-Gillies, 2019). In China as a whole, the current degree of

transnational corporations is far lower than that in developed countries, and the index of transnational corporations is still at a low level.

4. Chinese Multination

The 2018 Top 500 Chinese Companies list was announced. Opening the analysis report, the number of Chinese enterprises on the world's top 500 has increased from 115 last year to 120, only six less than the number of The United States on the list, ranking second in the world. There are about three times as many mainland Chinese companies on the list as there were a decade ago.

In comparison with history, the "top 100 Chinese Multinational Companies 2018" released shows that the entry threshold is 7.222 billion yuan, an increase of 17.49% over the previous year. In addition, the proportion of overseas assets, overseas operating income and overseas employees are 18.79%, 20.86% and 9.76% respectively, 2.78, 1.32 and 0.77 percentage points higher than the previous year. Overseas assets and overseas income continue to grow faster than overseas personnel, which has become the main factor to promote international operation.

Despite its huge size, it lags behind in the degree of internationalization. According to *the 2018 Top 500 Chinese Enterprises Analysis Report*, the average transnational index of "top 100 Chinese Transnational Corporations 2018" is only 15.8 percent, far lower than the average transnational index of "Top 100 World Transnational Corporations 2018" of 61.91 percent, and also lower than the average transnational index of "Top 100 Developing Transnational Corporations 2017" of 37.32 percent. *There is an urgent need for Chinese multinationals to improve their overseas assets, overseas revenues and the proportion of their overseas staff, as well as their overseas business performance*. According to Miao, the average proportion of overseas assets, the proportion of overseas business revenue and the proportion of overseas employees of the "top 100 Chinese multinationals 2018" are only 18.79%, 20.86% and 9.76% respectively, while the proportion of the "Top 100 World multinationals 2018" is as high as 62.15%, 64.93% and 58.65%. Therefore, to promote the internationalization of Chinese multination still have a long way to make through.

Table 6 Comparison between Top 100 Chinese TNC and World TNC

	Top 100 Chinese Transnational Corporations 2018	Top 100 World Transnational Corporations 2018	Difference between Chinese and the World
Average TNI	15.8%	61.91%	46.11%
Average proportion of overseas assets	18.79%	62.15%	43.36%
Average the proportion of overseas business revenue	20.86%	64.93%	44.07%
Average proportion of overseas employees	9.76%	58.65%	48.89%

5. Cognition of Internationalization

Maitland, & Sammartino (2015) indicated how the senior decision makers in multinational corporates make internationalization decision from the seven perspectives of mental models. The results shown that the heterogeneity in the understanding of opportunity in mental model is substantial. The individual judgement and cognition on decision and assessment is the key micro-foundations for making an enterprises internationalization strategy and corporate performance difference.

Miocevic, & Crnjak-karanovic (2011) demonstrated how the information and cognition affect the internationalization performance. The results shown that the ability of cognitive and informative had a significant effect on SEMs. In addition, the complexity of cognition has a positive effect on SEMs export performance.

Sommer (2010) presented how the attitude of SMEs managers will cause the internationalization behavior by introduced the Theory of Planned Behavior (TBP) and survey from diverse countries. The results shown that cognitive aspect is important from the beginning of SEMs. Researches only focusing on traits based and resource-based methods are insufficient. In addition, entrepreneurship courses have relations with cognition. Hence, more studies on diverse aspect on SEMs' internationalization behavior is needed.

Miocevic, & Crnjak-Karanovic (2012) illustrated the relationship between global mindset and export performance. The results shown that global mindset had a positive and significant effect on expert performance, and there has no moderating effect from international experience. Hence, the global mindset is a vital driver for the SEMs internationalization. However, the international experience cannot be applied in any foreign market to some extent.

Alinasab et al. (2021) established a knowledge driver method by using real option theory (ROT) by using AHP method in the context of Isfahan and Iran. The main factors and secondary factors were ranked by randomly selected 26 experts to participate in this study. The weighting value have calculated through AHP analysis with five choices. This method produced alternative plan for managers to reduce risks under diverse circumstances of entering international market.

6. Conclusion

In this part, the literature of relative international enterprises of globalization strategy, COI, and TNI were reviewed. The international contractors need a series of localized practices to obtain legitimacy, after that, the strategy of internationalization occurs. TNI is a method that measures the degree of multinationality of an enterprise mainly from few perspectives: assets, amount of sales, and number of employees. Enterprise internationalization cognition refers to an enterprise's judgment and understanding of the domestic and foreign macro trend industry environment and enterprise micro conditions. This cognition will be transformed into an enterprise's business philosophy and will guide the specific behavior and mode of its internationalization development (Zhang et al., 2021). This research will integrate those concepts according to the research context and contributes a measurement of COI together with suggestions for Chinese contractors.

Economics Theory

Economics is a social science that studies human behavior and how limited or scarce resources are properly allocated. There are several branches of economics such as microeconomics, macroeconomics, monetary economics, agricultural and natural resources economics, environmental economics, biological economics, etc., economics plays an indispensable role to support this study. Economic activities produce a series of

interventions that affect the integrity of natural systems (C. Ma & Stern, 2006). Therefore, it is necessary to consider the compensation and repair of these interventions for the construction of the human economy and society developing continuously.

1. Environmental Conservation vs Economic Development

Table 7 Advantages and Disadvantages of Environmental Conservation and Economic Development

	Advantages	Disadvantages
Environmental Conservation (Iravani et al., 2017)	Does not release anything detrimental into atmosphere	High implementing costs
	Bring economic profits to certain areas	Lack of information
	Need less maintenance	No known alternative chemical or raw material inputs
	It is renewable which means will never run out	No known alternative process technology
	Slow the impacts of global warming by reducing CO_2 emissions	Uncertainty about performance impacts, and lack of human resources and skills
Economic Development	Increasing Employment	Exchange rate fluctuations, currency appreciation, is not conducive to exports
	Increase income, increase people's consumption	Not good for exports, reduction of employment
	It can further promote economic development with people's consumption	The employment problem causes the consumption problem, the demand decreases, the economy shrinks

The figure below is the Environmental Kuznets Curve (EKC), it is a U-shaped curve that assumed the relationship between different pollutants and per capita income, that is, with the increase of income, environmental pressure rises to a certain extent and then it goes down. Dinda (2004) illustrated the development of theorical research and empirical evidence. First, the development of economics is from a clean

agricultural economy to a dirty industrial economy to a clean service economy. Second, the preference tendency of high-income people to environmental quality. However, question still existed from several aspects since there are only partial indicators such as air quality followed the EKC while inconsistence with the income level at which environmental degradation start decreasing. Therefore, there are still many unknown knowledge and hidden multidisciplinary researches need to investigate.

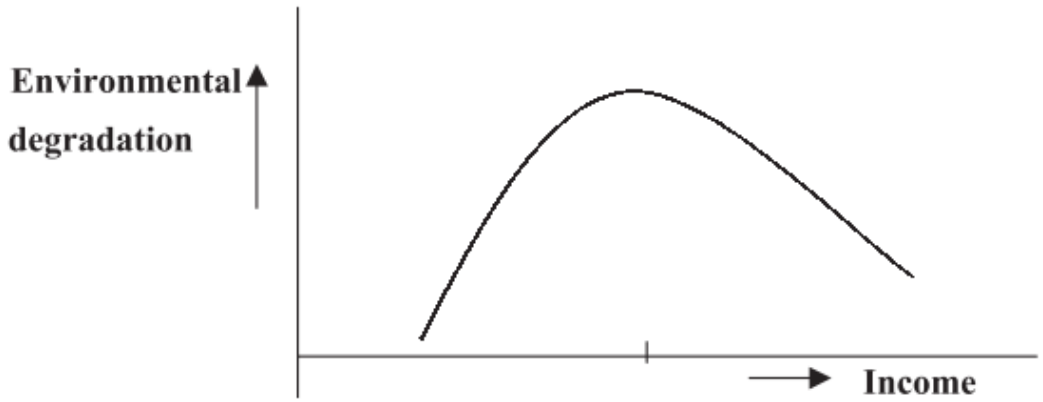


Figure 6 Environmental Kuznets Curve (EKC)

2. Environmental Economics

Many activities reduced the environmental disruption by paying tax, government subsidies, ecolabels, refund systems, and liability, caps, bans, and technology as well (Hackett, 2010). *Environmental economics refers to the application of the principles of economics to the study of how to manage environmental resources* (R. K. Turner et al., 1994). Environmental economics focuses on the static allocation of resources such as what is the appropriate level of pollution? What are the ways to achieve this level? It has developed a series of methods for assessing the costs and benefits of the external environment in order to include a more comprehensive environmental economic value. Therefore, environmental economics is considered as a weak sustainable development because benefits are often prioritized in the context of the regulation (Xiaoling, 2018).

Ahmed, & Long (2012) illustrated the relationship between the EKC, CO_2 emission, economic growth, energy consumption, trade liberalization, and population density in Pakistan from 1971 to 2008. The results shown that the hypothesis was supported by short term and long term simultaneously, the trade and environment have positive relations, and the population brings negative effect to the environment issues. This research results still followed the Dinda (2004)'s.

3. Ecological Economics

More recently, ecological economics has emerged, and many scholars considered ecological economics and environmental economics are related. However, *ecological economics conceptualizes the economy as an open subsystem of the biosphere that integrates energy materials with social ecosystems*. For example, the Effective loading of a boat ensures that the weight on both sides of the keel is the same and that the loading from front to rear is spread out so that the boat floats evenly in the water. Ecological economists consider the earth as a ship and productions produced by economical activities as the cargo (Daly, & Farley, 2011). A very important concept in ecological economics is the natural capital, scholars strongly insist that natural capital is irreplaceable and that artificial capital cannot be replicated without natural capital inputs (Daly, & Farley, 2011). Therefore, ecological economics can be considered as a strong sustainable development that is consistent with the central idea of this study.

Siebenhüner et al. (2016) reviewed the emerging area social learning as a part of ecological economics. With the comprehensive study of 54 journal articles, the results shown that comparing to technology, economic, and political factors, the social learning of management and governance for biodiversity, water, land, fisheries, and climate adaptation are increasingly important. These field could drive the transformation on social change and establish the core topic of ecological economics.

Uddin et al. (2016) illustrated the relationship between ecological footprint (EF) and economic growth based on the environmental Kuznets Curves (EKC) hypothesis and using the vector error correction (VEC) model. The previous researches used the income per capita, purchasing power parity, and current market change rates as an independent variable. In this research, applied EF as a more comprehensive measurement of environmental degradation with the data of developed

and developing countries from 1960 to 2011. The results shown that there should be an effective tradeoff between environment conservation and economic benefits through changing the pattern of consumption, resource use efficiency, and cleaner technology.

4. Conclusion

Environmental economics and ecological economics are different. The concept of environmental economics is trying to balance the environment and development through a physical and static way, whereas ecological economics prefers to consider the environmental problem as a dynamic system. In this system, there is no perfect balance between each group but from the lens of the whole picture to evaluate balance. One of the basic reasons is that the basic theoretical framework used to analyze and understand the basic objectives of human-economic-environment dynamics is different. The way of environmental economics is narrow, but it has been shown to be rigorous in analysis and more effective in influencing policy making while in ecological economics, it was challenging because of the multivariable method with comprehensive fields (Venkatachalam, 2007). With the development of the research, the gap between the two will become wider which supported by robust foundation and empirical studies.

Social Responsibility Studies and Activities in Thailand

From the Thailand Board of Investment (BOI), Mr. Kobsak Pootrakool, Deputy Secretary-General to the Prime Minister and Secretary to Thailand's Council of Economic Ministers said that Thailand expects its ongoing investment in major infrastructure in the next five years (2020-2025) and announced, "Thailand Investment Ecosystem Update". Office of Cane and Sugar Board (OCSB), Ministry of Industry in Thailand, has issued the strategical plan of sugar industry from 2015 to 2026, increasing the sugarcane acreage from 1.7 million ha. to 2.6 million ha., sugarcane production from 106 million tons to 180 million tons, sugarcane yield from 66 to 71 tons/ha., and sugar production from 11.1 million tons to 20.4 million tons. The purposes are to match the increasing consumption of sugar in ASEAN, to open more markets even Thailand already exports 90% of the total sugar to Asia, and to follow Thailand 4.0 policy (Solomon et al., 2016).

1. Social Responsibility Studies in Thailand

Review of CSR defined by ISO as 'The responsibility of an organization for the impacts of its decisions and activities on society and the environment, resulting in ethical behavior and transparency which contributes to sustainable development, including the health and well-being of society; takes into account the expectations of stakeholders; complies with current laws and is consistent with international standards of behavior; and is integrated throughout the organization and implemented in its relations.' The criteria of ISO including organizational governance, human rights, labor practices, the fairness of organizational practices, consumer and consumer, involving, and developing communities.

CSR practice in Thailand is now more than 20 years, in the early days, there were only a few large-scale companies concerned, nowadays CSR has become a hot topic. However, cooperates misunderstand the concept of CSR in Thailand and they consider CSR simply means "Customer Service Relations". Some companies in Thailand excluded environmental issues into CSR because there are too many details that need to consider whereas some companies consider environmental issues within CSR. In business practice, banking sectors have an impact on environmental and social, but they are indirect, such as lower loan rates. However, an industry with a higher impact on the environment and society will take more efforts on CSR for the company's sustainability. In a motivation perspective, the purpose of CSR is for corporate image, the originality of CSR is coming from the top managers' support and company culture. From the perspective of stakeholders, communities play a vital role in the project implementation, 'first, our neighbors have to love us. If one day they protest us, we won't be able to survive.' The sequence of community engagement is also a very important consideration of the project since a negative image for the community will cause conflicts and increase project costs especially for the megaproject. From the perspective of philanthropy, less preferred from companies but it's the inevitable issues in Thai culture, some companies considering donating is a kind of cosher activity so that companies prefer to initiative activities such as sustainability promotion, educational support, community business and educating skills. From the corporate governance (CG) aspect, the relationship between CSR and CG is intersecting and independent. From the transparency view, some companies

publish the environmental report is partially following by Global Reporting Initiative (GRI), but some are rejected by GRI since they only considering stakeholders around their site. From the perspective of the board, environmental and social issues are rare to the board, maybe one of the board members will assign to supervise those issues, it does not mean there are no regulations for project quality, safety and HSE (Kraisornsuthasinee, & Swierczek, 2006).

Classifying by industry, the company in the cement area focusing on environmental protection, green procurement, community activities, and publish annual environment and social reports. A concrete company following the guideline from European partners and release the environmental report. From the energy and utility industry, especially with high impact on the environment of the energy industry, guideline from Global Reporting Initiative (GRI) is applied, environmental impact assessment, environment management system, safety training of staff, and environmental and social reports are published. The oil industry is highly focusing on local communities and ethical business practices. In the banking industry, CSR is initiative according to the CEO preference, they use CSR to evaluate enterprise loans, advise managing, and conduct community volunteer activities (Kraisornsuthasinee & Swierczek, 2006).

CSR disclosure of the top 40 Thai companies shown an increasing trend from 1997, 1999, and 2001. The information disclosure order based on the number of words are environment, energy, customer, community, employees, and general, another rank in terms of theme are human resources, environment, community, energy, and product. The CSR disclosure is similar to more positive information than negative information whether in the US, the UK, or Australia (Sunee et al., 2006).

Virakul et al. (2009) illustrated that CEO leadership, company financial performance, and stakeholder expectations are the main motivation of CSR behavior of four awarding-winning in Thailand, the specific behaviors are education, arts, culture, physical education, environment, and welfare. A CSR behavior framework of corporates was proposed as follows. However, these CSR behaviors may not suitable for the sustainability of megaprojects.

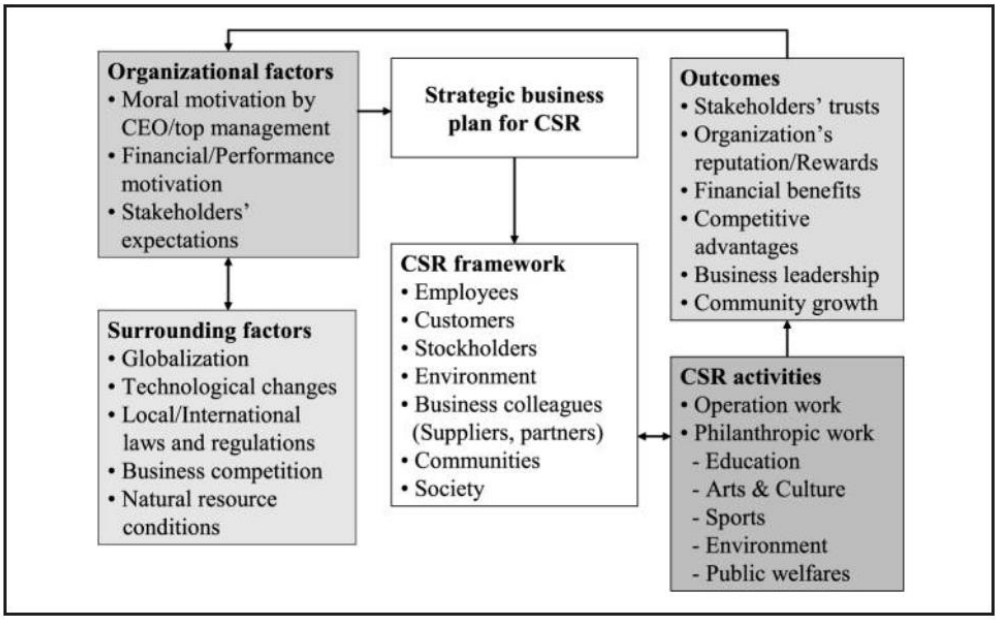


Figure 7 A CSR behavior framework of corporates

Sreesing et al. (2019) examined tax incentives and CSR activities from 2012 to 2013 in Thailand. The result has shown that the correlation between corporate income tax and CSR activities is negative, which means that reduce tax makes corporate implement more social responsibility activities. In contract, the higher tax will burden the company with financial problems, therefore, decrease the social responsibility activities initiative.

The "Water Grid", an unprecedented megaproject was launched to solve the water usage problem in the north-eastern part in Thailand called Isaan as a case study to demonstrate the relationship between megaprojects, social and environmental changes, the project was protested for a long time, therefore, the Ministry of Science, Technology, and Environment formed an expert committee to analyze environmental impacts: geographical landscape unsuitable, increasing of salinity problems, farm chemical using in the dry season, and impacts on fisheries of Mekong Rivers, this project rarely considering from the perspective of social and environment finally stopped because of Thaksin administration collapse (Molle & Floch, 2008).

During the initiation phase of large and medium scale projects, for the sake of promoting the progress, politicians from the government level will announce the benefits and welfares that the public would get from the project, but actually, it is another way to get benefits (Ockey, 1994).

Kittipongvises et al. (2016) proposed an assessment indicator system and method to reduce Greenhouse Gases (GHGs) emission of granite mining factories to avoid global climate change and come up with a feasibility scenario, and finally to exploit a sustainable energy protection system for the energy industry in Thailand.

Kokkaew, & Rudjanakanoknad (2017) proposed a Green Growth Index (GGI) which considering both economic and environmental performance especially for the green growth assessment of high-speed way through Life-cycle Analysis (LCA) since transportation contributes 14% of environmental degradation. This study takes a hypothetical highway project as a case study and then apply a real project called Kanchanaphisek Road as a real case study. The proposed index GGI would help the project manager to assess whether the project is green and economic growth, green but non-economic growth, economic growth but not green, and non-economic growth and not green. The results have shown that green and growth are two opposite sides, more specifically, the higher economic growth, the higher carbon emission from projects.

As above mentioned, it is quite controversial regarding the scope or criteria of CSR. Based on this gap, introducing MSR in Thailand is necessary. Rarely scholars have emphasized the importance of MSR because there is no overall and perfect system yet, and there are not many studies even from unilateral analysis of MSR and few types of research on the sustainability integration of megaprojects, most of which are based on the economic sustainability of megaprojects. There are only a few kinds of literature from the diverse angle of megaproject sustainability and research of the concept of megaproject social responsibility (Mok et al., 2015). Therefore, introducing MSR to Thailand is very important for sustainability.

2. Activities of Social Responsibility in Thailand

The Mid Map of the social responsibility behaviour and activities are modified through literature review, report reading, interview, and site visiting.

This research have classify SR into three phases, short term, refers to build strong reputation quickly (Chung et al., 2015), medium term means that production-process CSR activities for effective business performance and express CSR during the philanthropic activities (Virakul et al., 2009), and long term represents the strategic cooperation which reach consensus from several degrees and not easy to destroy (H. Ma et al., 2017) and that's what we called MSR in this research. The corresponding activities of each stages are listed below in Appendix 6.

Conclusion

This chapter has mainly reviewed the literatures and theorical backgrounds on the relationship between MSR, SECM, SEAP, and COI.

For MSR, it is a concept of social responsibility from the perspective of megaprojects and first announced by S. X. Zeng et al. (2015) which focusing on 'what do you want to do' (policies) and 'how do you do that' (practices) for stakeholders and well-being created through the whole lifecycle of the megaproject beyond the 'three-triangle'. The performance be MSR are on several dimensions: economic and quality, legal and regulation, ethical and environment, and pollical and philanthropy.

In terms of the relationship between MSR and SECM, even though the environment management is a part of social responsibility when a new project has been launched, the original 'old' ecology is broken. It is necessary to establish a 'new' ecology by means of environmental remediation. The establishment of ECM is required stakeholder participation instead of the popular cognitive inertia of government's issues only (Kokubu et al., 2019; Panya et al., 2018; Tevapitak & Helmsing, 2019). Thompson and Friess (2019) highlight the importance of involvement of all stakeholders in Thailand and demonstrated that the environmental and economic motivations may become unclear in the context of social ecosystem.

In terms of multination corporates and stakeholders and MSR, Boiral and Heras-Saizarbitoria (2017) suggested a 'protection of biodiversity' method to help multination to achieve regulation requirements and protect company reputation, in turn to increase the revenue. Hellweg and i Canals (2014) proposed a 'sustainable implementation of life-cycle assessment strategy' to assist companies to optimize the environmental property of production, and 'waste management' method through 3R

principle, reduction, reuse, and recycle (B. Huang et al., 2018). Faced with the unfamiliar institutional environment and stakeholder networks in overseas markets, international contractors need a series of localized practices to obtain legitimacy, which is usually closely related to social responsibility (Yang & Rivers, 2009). The concept and implementation of stakeholder participation have been used in different areas, ecosystem, natural disasters (Aldunce et al., 2016), zone planning (Buanes et al., 2005), service innovation process (Ommen et al., 2016), policy (Challies et al., 2017), etc. and many scholars are calling on the participation of stakeholders appropriately (Lynham et al., 2017). Therefore, studies on megaprojects with international contractor involving in the mechanism establishment through the stakeholder participation, and appropriate mechanism for different stakeholder participation is urgent need.

Based on the comprehensive literature review, there should be the ECM leading by the government and local government, SECM initiated by the megaproject's future performance, and SECM established by two-sides government. This study aims to contribute to the literature by providing current situation of MSR and its relationship with SECM and how their relationship affected by stakeholder participation, together with the moderating of COI.

CHAPTER III

METHODOLOGY

Research Processes

This study is based on the results of literature analysis of background, following by interview, bibliometric analysis, and questionnaire survey to investigate the relationship between MSR and SECM. The research processes are in Figure 9.

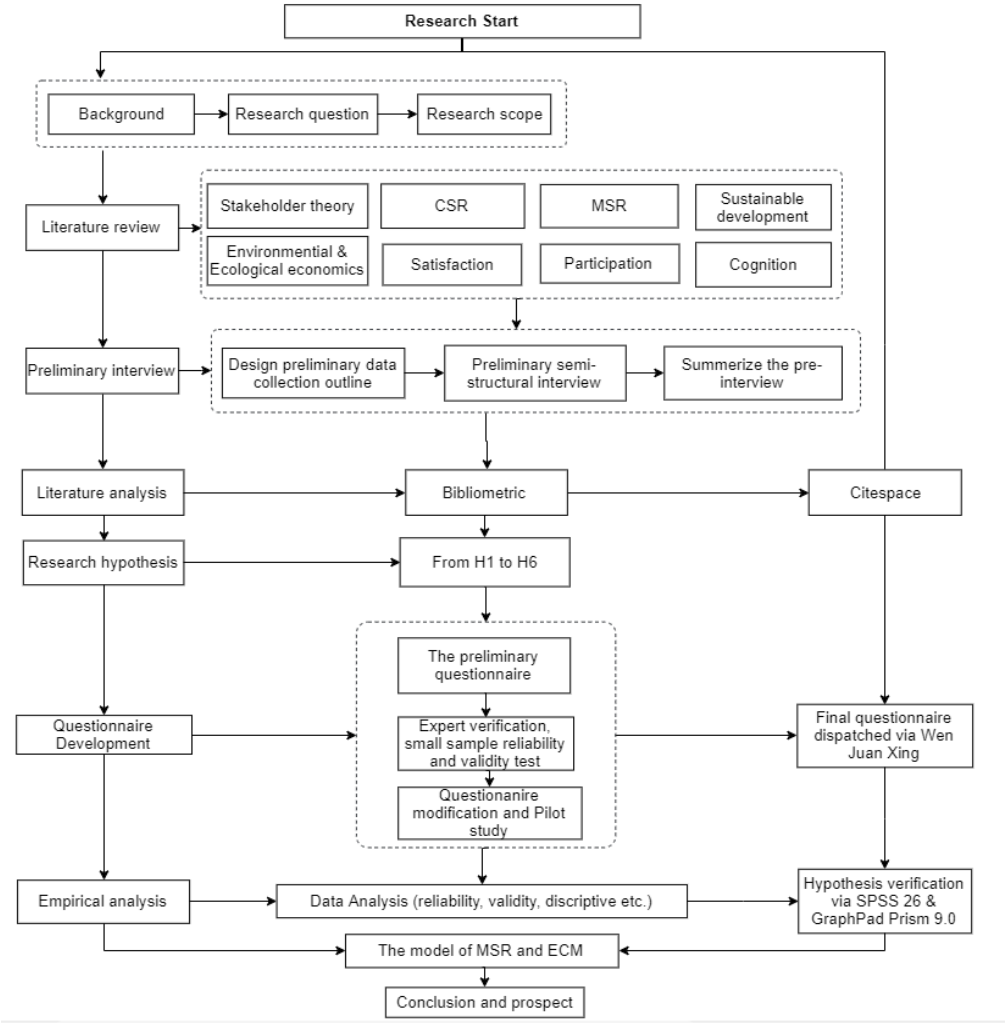


Figure 8 Research Processes

Sample Design and Data Collection

The sample in this study are stakeholders with experience of major engineering projects, and the background of data collection is Thailand. The time interval is set at 2010-2020. A preliminary data collection was collected through a face-to-face interview of Chinese contractor with subsidiary in Thailand and the data for pilot study was collected through these subsidiaries as well.

1. Research Sampling

1.1 Why Sugar Mills and Power Plants

The researcher mainly investigated the residents in the vicinity of the sugar mills and power plants, the reason is because sugar mills and power plants have partial similar function which is generate electricity to support daily use and selling electricity to the government by using biomass waste such as sugarcane waste, rubber wood chips, palm leaves, and palm shells. Moreover, we examined research hypothesis by using questionnaire survey data from Chinese contractors and stakeholders who have been constructed and delivered sugar mills and power plants in Thailand. It is worth to mention that the PTG 24MW Biomass-fired Power Plant Project in Nong Chik, Pattani is a representative project of China's BRI in Thailand and invested by Thailand PTG. After completion, the project will realize the effective utilization of crop waste in surrounding areas and provide clean electricity for the local area, which is of great significance to the social and economic development of Thailand. In the process of development, the project has created nearly 1,000 employment opportunities for the local people. After the project is put into operation, the annual generating capacity will reach 192 million KWH. It is estimated that the annual tax payment will be US $280,000. This will not only greatly relieve the electricity shortage of Pattani Province in southern Thailand, but also play an important role in promoting local economic growth and social development. Moreover, Baanrai Sugar Mill Project is another important project which China's first overseas EPC sugar factory *Luban Award* project is, and this award is China's top award in the construction industry. Therefore, these Chinese contractors involved projects could be the representatives and could be selected as cases.

1.2 Sample Size

Since the sugar mills and power plants projects are in these places as Table 8 below, therefore the total sample N=708,504.

Table 8 Projects' Information and Population

Industrial type	Population	No. of Project	Project Name & Position
Sugar Industry	66,167	2	Baanrai Sugar Mill Project in Thailand. - 12000 TCD & 700 t, & Three sets of 8000 m³ Final Molasses Tank Uthai thani
	93,810	1	C-line EPC Sugar Mill Project, 12,000 TCD, Khon Buri
	172,752	1	RAJBURI CANES AND SUGAR CO., LTD in Thailand. with daily milling capacity of 12,000 tons, Ban Pong district, Changwat Ratchaburi
	35,330	1	EASTERN SUGAR&CANE PUBLIC COMPANY LIMITED, Wang Sombun, Sa Kaeo
	124,200	1	Kaset PHOL SUGAR LTD, Udon Thani
Power Plant	53,063	1	Biomass Power Plant, Woodchip, Boiler & Steam Turbine Generator, 7.5 MW, Weang district, Narathiwat
	60,620	2	2X9MW Biomass, Yala
	76,630	1	PTG 24MW Biomass-fired Power Plant Project, Nong Chik, Pattani
	25,968	1	Thailand Burinam Energy Co., Ltd. Power Plant EPC Project
Total	**708,504**	**11**	

The sample size is determined in accordance with the requirement of 95% confidence level and allowable error within 5%. Therefore, according to the Cochran Formula Israel (1992) and Smith (2013), the sample size:

$$n = \frac{z^2 p(1-p)}{e^2} = \frac{(1.96^2)(0.5)(0.5)}{0.05^2} = 384$$

Therefore, considering the problems of valid questionnaires, the number of questionnaires issued should be adjusted to about 400 but not less than 384, and the corresponding number of questionnaires issued should not be less than 400.

Identification of invalid questionnaire is an important link of the data reduction. The traditional identification method of invalid questionnaires is a qualitative analysis method. For example, Ren et al. (2011) process method regards the following cases as invalid questionnaires:

1) The omission items exceed 2 or more;

2) The omission items are totally more than three in one single questionnaire;

3) The successive ten items totally select the same score grade;

4) There are multiple keys to one problem;

5) Short time answer.

In this study, subjects were selected to be representative of the entire population using both the purposive sampling and the volunteer sampling, as the sampling method enabled the researcher to generalize the findings to the entire population.

The purposive sampling technique, also known as judgment sampling, are deliberate choices made by participants based on qualities they possess. This is a non-random technique that does not require a basic theory or a certain number of participants. Simply put, the researcher decides what needs to be known, and then sets out to find people who are able and willing to provide information based on their knowledge or experience (Etikan et al., 2016).

2. Research Steps

Questionnaires will be the quantitative analysis method integrated with semi-structural interview to transfer the research objectives into particular questions, as a result of collecting data quickly and efficiently. The specific research steps are described, and the outline of the questionnaire are shown:

Firstly, literature review and summary. Through the review of relevant literature, the research problems and ideas, the basic conceptual models and theoretical assumptions of the components are clarified, and the main variables to be used in the research are clarified. The first draft of the questionnaire was completed based on Likert's 5-point scale. Secondly, expert interviews. Through interview with experts in the fields of project management, mathematics and statistics, environment management, internationalization, and satisfaction to further strengthen the hypothetical model and questionnaire draft. Thirdly, site visiting. field visits to research projects, in-depth investigation on project sites, communication on questionnaire content, and design. Fourthly, questionnaire design and pretest. Discuss the applicability of the scale with several industry experts, scholars and PhD students in the field of engineering management, and further modify, optimize, and correct the scale to ensure the scientific and accurate expression of the items in the questionnaire, followed by a small sample test of the validity and reliability to modify questionnaire and formed the final questionnaire. Lastly, the issue and collect of the final questionnaire and the questionnaires are distributed through the online questionnaire survey.

3. The Outline of Questionnaire

3.1 Part 1 Demographic Information

Table 9 Demographic information

Questions	Scale
Year of birth	
Gender	Female or Male
Religion	
Income	Lower than 10,000, 10,000-20,000, 20,000-40,000, 40,000-60,000, 60,000-80,000, more than 80,000 (baht)
How many years have you worked in the megaproject industry?	1-5 years, 5-10 years,
	More than 10 years

Questions	Scale
What is your highest education?	Ph.D, Master, Bachelor, High School, Under the high school
What's your major?	Engineering technology, Management, Financing, Other
For megaprojects, which of the following groups do you belong to?	The central government, the local government, Chinese contractor or sub-contractor, media, community or public.
	Designer, owner, supplier, project supervision, operator.
Are you familiar with social responsibility?	Never heard at all A little understanding Have clear understanding Know more about this Very familiar
How did you learn about social responsibility?	Mass media such as newspapers and television, Internet, Training and learning, Social occasions, Others

3.2 Part 2 MSR Indicators from the Project

The table below shows the MSR indicators draft summarized by literature and mostly cite from Lin et al. (2017), Kraisornsuthasinee and Swierczek (2006) and Virakul et al. (2009). The short term ECOR is Economical Responsibility, LR is Legal Responsibility, ETHR is Ethical Responsibility, PR is Political Responsibility. Using Likert 5-, 7-, and 10- point scales than coarser scale can increase reliability and validity of simulation studies and empirical studies. But why 5-point scale? Since the 5-point format can readily be transferred to 7-point and 10-point equivalency using a simple rescaling method (Dawes, 2008). Applied Likert's 5-point scale to measure (Likert, 1932). 5: very important, 4: important, 3: normal, 2: little important, 1: not important.

Table 10 MSR indicators from the project

Project life cycle	Stakeholders	Primary SR	Secondary SR
Initiating stage	The central government and local government	ECOR	Economic feasibility decision of the project
			Technical feasibility decision of the project
			Economic consideration for each stakeholder
		LR	Information disclosure
			Public participation (public hearing)
		ETHR	Consideration of environment & ecology
			Respect Religion (alms giving)
		PR	National security, international community's effort, security of life, the economy and people's livelihood
			Focus on local community relations and impact
	Media	LR	Activities are law-abiding
			Independence and impartiality of reporting
		ETHR	Focus on ethical, religions and environmental issues
		PR	Focus on local community relations and impact
	Remarks		
Planning and Design stage	Designer	ECOR	Design quality and economic feasibility
			Innovation and technological progress
		LR	The design conforms to industry standards
		ETHR	Green design
		PR	Focus on community needs
	The central government and local government	ECOR	project design costs control
		LR	Project design scheme disclosure
		PR	Project design scheme public participation
	Environmental Agency	LR	Environmental impact assessment (EIA) report

Project life cycle	Stakeholders	Primary SR	Secondary SR
	Local community	LR	Public participation report
			Optimal investment options
	Remarks		
Construction stage	Project Legal	ECOR	Perfect project governance
			Focus on engineering quality and safety construction
			Safe and reasonable return of investment funds
		ETHR	Green construction adoption
		PR	Focus on community and public needs
			Maintain social stability
	Chinese Contractor	ECOR	Engineering construction quality and safety guarantee
			Project construction cost and time limit control
			Construction technology innovation and progress
		LR	Follow the laws and industrial regulations
		ETHR	Reasonable utilization of resources in construction stage
			Ecological conservation of construction areas
			Community environmental protection of construction areas
			Local culture and religious involvement
		PR	Maintain community relations
			Emergency public event handling
	Project supervision	ECOR	Supervision of project quality and safety
			Supervision of the rights of project staff and labors
		ETHR	Supervision of the environmental protection of project construction
	Suppliers	ECOR	Quality assurance of construction materials
		ETHR	The use and promotion of the green materials

Project life cycle	Stakeholders	Primary SR	Secondary SR
	Regulator (Chamber of Commerce)	ETHR	Supervision of the construction industry
	NGOs	ECOR	Ensure the use of funds
			Ensure the health and safety of staff and local
		ETHR	Local culture and religious involvement
		LR	Transparency information of funds and activities
	Remarks		
Operation stage	Operator	ECOR	Normal maintenance
			Project operation cost control and quality assurance
		LR	Operating follow by the laws and industrial regulations
		ETHR	Regional ecological and environmental protection
			Community environmental protection
			Reasonable utilization of resources
		PR	Maintain community relations
	Remarks		

3.3 Part 3 Stakeholder Environmental Activities Participation during Project Life-cycle (SEAP)

In this part, application of Likert's 5-point scale to measure the SEAP-PL. 5: very high, 4: high, 3: normal, 2: low, 1: very low. It was measured with Lamm et al. (2013) scale. The scale was selected since it was the original scale through a systematically measurement processes: generation and reduction, dimensionality, reliability checking, and convergent and discriminant validity checking.

Table 11 Measurement of SEAP

Have you ever been involved in environmental activities of megaprojects?	**Yes or No**
Which phases you have attended to protect environment during the project-lifecycle? (MCQ)	Initiating stage, Planning and Design stage, Construction stage, Operation stage
Factors affecting my participation in environmental activities:	
Because of the publicity of environmental activities	5-strongly agree 4-somewhat agree 3-neither agree nor disagree 2-somewhat disagree 1-strongly disagree
Because of company assignment	
Because of the laws and regulations	
Because I follow the policy of the host country	
Because I have free time	
Because of my daily habits	
Because it impacts on me and my children's daily life	
Because I know project brings drawbacks to environment	
Because environmental issues will affect the development of economic	
Projects involving international contractors will enhance my involvement in pollution and control	
Project involving international contractors will enhance my involvement in ecological and environmental protection	

3.4 Part 4 Satisfaction of Environmental Compensation Mechanism (SECM)

In this part, application of the Likert's 5-point scale to measure the satisfaction of ECM. 5: very satisfy, 4: satisfy, 3: doesn't matter, 2: not satisfy, 1: not satisfy at all. The measure is proposed basically follow by the MNRE document in 2015 with the satisfaction of stakeholders, and Li et al. (2013).

Table 12 The Measurement of SECM

Whoever causes pollution is responsible for its treatment	
The government changes citizen behavior and private enterprises are actively involved in environment protection activities by means of coercion, support and guidance	5-very satisfy 4-satisfy 3- neither satisfy nor unsatisfied 2-not satisfy 1-not satisfy at all
Promote environmental protection through environmental experts, enterprises reform	
Companies themselves improve technology and reduce pollution	
Increase the energy efficiency to international standards	
Increase awareness and cognition	
Increase the production, use, and market of alternative energy	
Establishment of Council	
Relative policies establish by the central government and local government	

3.5 Part 5 Cognition of Internationalization (COI)

In this part, the concept of the scales is referenced by Sui Pheng and Hongbin (2003) and Zhang et al. (2021) with the modification according to the research context. The COI is measured by four parts: (1) International attitude, (2) Subjective norm, (3) Perceived behavioral, and (4) Dual cognitive. The Likert's 5-point scale to measure the COI: 5: agree at all, 4: agree, 3: normal 2: disagree, 1: disagree at all.

Table 13 Measurement of COI

International attitude	Company is willing to actively improve the international operation methods. Such as offices, subsidiaries or joint venture companies
	Company is willing to undertake and grasp the risks and opportunities in the process of internationalization
	Enterprises are willing to participate in the international division of labor and cooperation, such as the division of labor contracts with foreign companies, joint production, etc

Subjective norm	The reform of domestic market economy urges enterprises to participate in international operation	
	The demand of international environment provides a market for the internationalization development of enterprises	
	The national policies of the International Cooperation Initiative are conducive to the overseas development of enterprises	
	The governments of countries participating in international cooperation initiatives provide convenience for the international operation of the Company	
Perceived behavioral control	The enterprise has the ability to utilize domestic market resources	5-Agree at all
	The enterprise has the ability to utilize foreign market resources	4-Agree
	Enterprises can take advantage of domestic government policy resources	3-Normal
	Enterprises can make use of foreign policy and government resources	2-Disagree
Dual cognitive	The enterprise is familiar and follows the laws and market management norms of the host country	1-Disagree at all
	The enterprise can keenly perceive changes in the international market and grasp opportunities	
	The enterprise has close links with the government agencies of the host country and can get support	
	The enterprise considers new foreign suppliers and customers	
	The enterprise is aware of the characteristics of high risks in the international business environment and attaches importance to a cautious and gradual approach	
Internationalization behavior	The enterprise participates in import and export activities in the international market	
	The enterprise conducts human resources exchange activities with the international market	

	The Company actively explore business cooperation with other foreign enterprises
Internationalization performance	Enterprises improve productivity in the process of participating in international cooperation
	Enterprises obtain higher financial benefits in the process of participating in international cooperation
	Employees have a high degree of recognition for the international business activities of the enterprise
	Overseas customers have a high degree of recognition for the company's international business activities

Preliminary Study

1. In-depth Interview

In this study, the researcher employed a semi-structural interview with the General Manager (GM), the Director of R&D Department (DD), and Senior Engineer (SE) of Guangxi Construction Engineering Group No. 1 Installation Co., Ltd. as a preliminary study. Regarding to the interview outline, although the outline was originally developed in Chinese, it was later translated into English to consider the reader's comprehension through a backtranslation technique to establish linguistic equivalence between two versions (Chan, 2001). They all considered this interview was very interesting and meaningful since this was the first time to discuss the topic of social responsibility.

2. Output from Preliminary Study

From the interview results, we summarized the stakeholder structure of sugar malls in Thailand. The structure and interview detail please see in **Appendix B**.

Bibliometric Analysis

1. Bibliometric

Bibliometrics is the study of books, papers, and other publications using statistical methods. In the subject of library and information science, bibliometric methods are extensively utilized. Scientometrics is a sub-discipline of bibliometrics that deals with the examination of scientific publications. Scientific knowledge mapping is a scientific bibliometrics method. When it is difficult to obtain the latest

and relevant systematic evaluation of a research field, scientific text mining provides a valuable input source for the overview of the research field and the systematic discussion (C. Chen & Song, 2019). Visualized graphs and ordered knowledge networks of scientific knowledge maps are able to extract new knowledge after the association, interaction, and evolution between knowledge individuals and knowledge communities (Yue et al., 2015) like CiteSpace and VosViewer. Academics have used CiteSpace in a variety of fields, such as environmental problems and social responsibility (Z. Zeng, & Hengsadeekul, 2020), sustainable development (Ye et al., 2020), geographic information system (GIS) knowledge (Wei et al., 2015), pharmaceutical knowledge (Liang et al., 2018), climate change and tourism (Fang et al., 2018), etc. Analyzing pairs of papers that are cited together in the source articles is called co-citation analysis. Clusters of research begin to form when numerous authors mention the same combination of papers. These clusters of co-cited papers tend to have a shared theme.

2. Citespace

CiteSpace is an excellent bibliography visualization tool for analyzing various literatures, and it can also uniquely represent research frontiers and knowledge bases, the evolution of research frontiers, and the literature that plays a key role in the evolution process (Yue et al., 2015). The main operation background of CiteSpace is to identify new trends and potential changes in the development of science and technology based on co-citation analysis theory and search network algorithm (C. Chen, 2017), which is also the main reason why this research chooses CiteSpace as the analytical instrument. At the same time, CiteSpace can not only analyze the data from WOS by keywords, authors, institutions, countries, co-cited references, cocited authors, etc. but also operate easily without the need to do complex data conversion. The CiteSpace version applied in this study was 5.5. R2 (64-bit).

3. Output from Bibliometric

In this research, SCIE and SSCI citation indexes were selected from WOS. The research code TS = (environmental innovation AND social responsibility), the time period of the code is from 2010 to 2020. There were 689 pieces of literature obtained in the first retrieval. After refining with the document's language are English,

types are article and review, categories are environmental studies, environmental science, management, business, green sustainable science technology, economics, ethics, and ecology, 559 literature data were finally selected. Due to the need for analysis, the content of the data including all bibliographic information: author, title, source publications, abstractions, keywords, and references cited. CiteSpace will assist us in determining the subject group.

As shown in Figure 9, the clustering of keywords can be classified into 12 categories. Cluster #0 is Mediating effect, cluster #1 is Environmental sustainability, cluster #2 is Environmental policy, cluster #3 is Firm visibility, cluster #4 is Environmental practice, cluster #5 is State ownership etc.

As shown in the Figure 10, we could see that the research keywords in diverse time periods. Three stages were classified by keywords: Introductory stage (2010 to 2015) consists of five burstness: innovation, CSR, management, performance, and social responsibility. In the next place, the Evolution stage (2012 to 2017) has four burstness: environmental management, impact, business, and SME. Thirdly, there are three burstness words in the Mature stage (2016 to 2020): perspective, firm performance, and policy. According to the arrangement and refinement of burstness words analysis, we investigated that extensive and wide research was conducted in the early stage, following by the middle and late phases, researches started from shallow to deep and continuing narrow down.

Last but not the least, when the scope is narrowed down to a certain extent, how do you proceed the next progress? At this time, an assessment of the previous work is vital. Therefore, the satisfaction and participation will be a critical and effective consideration for the following research.

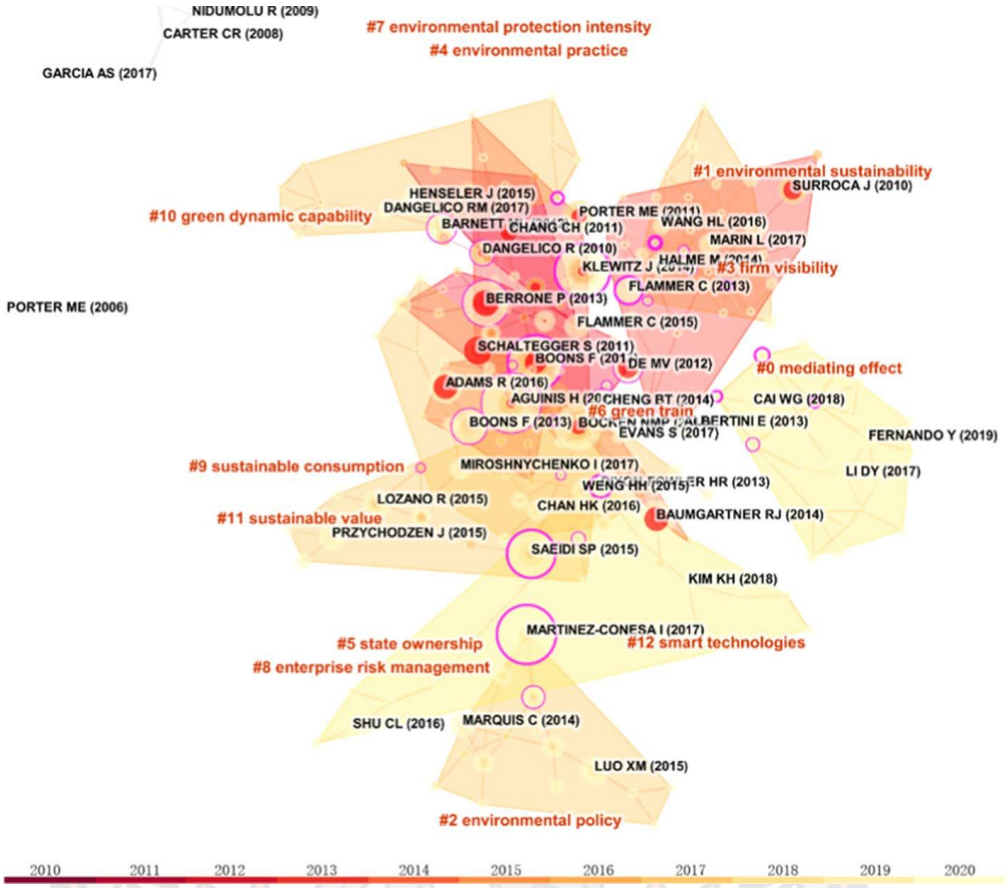


Figure 9 Cluster Map of Document Co-citation

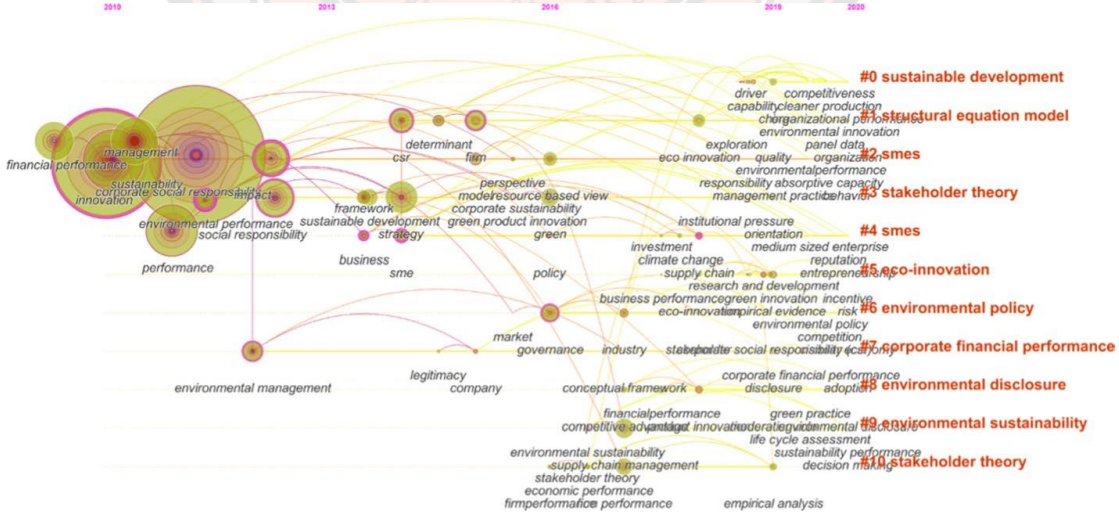


Figure 10 Timeline Map of Research Hotspot

Questionnaire Index of Items-Objective Congruence

1. What is Questionnaire IOC

At this stage of questionnaire index of items-objective congruence (IOC), in order to properly use and interpret the data obtained from the measurement tool, the score of the content validity and reliability corresponding to certain construct must be clearly measured (R. C. Turner & Carlson, 2003). The most important part of content validation is to assess the compatibility of the construct and objectives. If there are not enough evidence to prove the objective that researchers would like to achieve, the rest of the analyses are of no practical significance (Berk, 1984). Specifically, those experts are going to evaluate each item lists by giving a rating of 1 (for clearly measuring), -1 (clearly not measuring), or 0 (the degree to which it measures the content area is unclear).

2. Output from Questionnaire IOC

In this research, there are five experts from diverse research areas to assist the questionnaire IOC, sustainability, corporate management, project management, social science, and supply chain finance, respectively. All experts critically gave feedbacks to some of the questions and the summary of the score is attached in Appendix 3. In summary, the feedbacks are shown below.

Table 14 Summary of Experts Opinion

	Experts Opinion		
Overall	Use less terminology to reduce confusion, try to use more colloquial expression; Clearly classify questions in each section.		
MSR	Project initiating stage	National security, international community's effort, the security of life, the economy and people's livelihood	*The question is too long with more than 1 factor. Consider split into more than one question.*
		Design quality and economic feasibility	*This should be the govt's job.*
	Project construction stage	Supervision of the rights of project staff and labors	*this question is more of ETHR than ECOR*

	Experts Opinion		
		Follow the laws and industrial regulations	*Also, implement of measure identified in EIA report*
		Ensure the health and safety of staff and local	*Should be part of ETHR*
	Project operating stage	Operating follow by the laws and industrial regulations	*Operating follow by the laws and industrial regulations, and contract agreement*
Satisfaction of ECM	Some expressions need revision		
Participation	Because of my daily habits	*Should we revise to "professionalism"?*	
	Because I have free time	*I would use "Because of my personal interest"*	
DOI	Better to edit the degree of internationalization (DOI) into the cognition of internationalization (COI)		

Pilot Study

Pilot test is required before collecting final research data by using the questionnaire (Saunders et al., 2007). The respondents of the pilot study should be replication at the similar group and levels of as the final data collection respondents. One of the purposes of the pilot study is to investigate or determine whether the current research tools can correctly and intuitively reflect the matching degree of the problem and the construct. On account of the reliability and validity of the existing scales has been tested and well used, yet the context difference and language diversity still exist. Hence, researchers who willing to apply existing scales are still supposed to conduct pre-test study (Brace et al., 2012).

Another purpose of the pilot study is to ensure that all questions are able to easily understand by all respondents. For example, by checking the gramma errors, measurement of the words etc. Several feedbacks would be received after the pre-test study from respondents and researchers should be modified questions according to the feedbacks, especially focusing on feedbacks from key insiders (De Vaus, 2001). After

edited the questionnaire through the first-time feedback, the second round of the reliability and validity test of the questionnaire is required.

It is extremely significant to finish steps above even though they are high costs and time-consuming. If you ignore those steps, you will end up with a much more expensive job whether physically and mentally. Therefore, the pilot study is critical to not only this research, but also all kinds of researches that are willing to use questionnaire methodology.

1. Pilot Study in This Research

As discussed above in 3.2.3, preliminary scales adapted in this research are including: Scale of MSR, An indicator system for evaluating megaproject social responsibility by Lin et al. (2017) for the structure of the questionnaire, Interpretations of CSR in Thai companies by Kraisornsuthasinee and Swierczek (2006), and CSR activities in award-winning Thai companies by Virakul et al. (2009) for the questionnaire fitting degree under the context of Thailand. Scale of SEAP, Read this article, but don't print it: Organizational citizenship behavior toward the environment by Lamm et al. (2013). Scale of SECM is following by the MNRE document in 2015, and Evaluating stakeholder satisfaction during public participation in major infrastructure and construction projects by Li et al. (2013). Scale of COI is following the Internationalization of Chinese construction enterprises of Sui Pheng and Hongbin (2003) and The influence of enterprises' internationalization cognition on their international operation under the Belt and Road Initiative by Zhang et al. (2021).

The pilot study was proceeded in June 2021 via a professional online questionnaire survey, examination, evaluation, and voting platform called Wen Juan Xing. A letter and questionnaire were designed and dispatched based on this platform. The content of the letter including the purpose of this research, seeking respondents to answer the questionnaire, and questionnaire description. All respondents need to finish all questions and finally going to submit questionnaire.

2. Difficulties Encountered in Pilot Study

Difficulties encountered in this research pilot study including: (1) Searching respondents. Due to the COVID-19 pandemic disease appeared and regional difficulty, respondents could only search via social network tools such as Line, Messages, WeChat, and email address. (2) Question understanding. Some of

respondents did not fully understand what the question is asking because of the diversity of majors. A few respondents replied that they are hard to finish this questionnaire because they have no experiences in this field. Hence, comments and feedbacks from the pilot study was collected, then modified questions to make this questionnaire was accurately worded and well structured (Saunders et al., 2007).

3. Reliability and Validity of the Preliminary Study

3.1 Reliability Test

Before dispatching the final questionnaire, a preliminary study is required. There are 204 respondents attended the pilot study. The research tool applied in this study is SPSS 26st edition. The reliability of the scale or test is a measure of the internal consistency by calculating the value of the Cronbach's Alpha coefficient (Tavakol & Dennick, 2011). The higher the Alpha value, the higher the correlation of the terms in a construct. Generally speaking, if the reliability coefficient of the questionnaire is above 0.9 which represents the questionnaire survey is acceptable and reliable.

As shown in Table 15 of the reliability test result of preliminary study, N = 203, the reliability of overall scale is 0.993 $>$ 0.9, which indicates that the reliability analysis results are reliable, and the consistency between the items in the questionnaire is acceptable. From the perspective of each dimension, the Cronbach's Alpha value of dimension 2, 3, 4, and 5 are both higher than 0.9, represents the reliability of each dimensions are good.

Table 15 Reliability Test Result of Preliminary Study

Dimensions	Cronbach's Alpha	Number of Terms
2. Evaluation of social responsibility (MSR)	0.989	39
3. Stakeholder Environmental Activities Participation during the Project Life-cycle (SEAP)	0.973	11
4. Satisfaction with the Environmental Compensation Mechanism (ECM)	0.973	15
5. How much you know about internationalization (COI)	0.986	23
Overall Scale	0.993	88

3.2 Validity Test

An exploratory factor analysis was conducted in this research to test the research validity. Kaiser (1974) demonstrated that if the Kaiser-Meyer-Olkin (KMO) value higher than 0.8 represented the research validity is meritorious. As shown below in Table 16, firstly, the KMO value is 0.935, higher than 0.8, represented that the correlation between variables is strong, which is suitable for factor analysis.

Table 16 KMO and Bartlett's Test of Preliminary Study

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.935
Bartlett's Test of Sphericity	Approx. Chi-Square	28151.585
	df	3828
	Sig.	0.000

Secondly, the result of factor analysis as shown in Table 17, totally there are 88 components are given and sort from the largest value to the smallest value. The initial eigenvalues of component 1, 2, 3, 4, 5, 6, 7 are ＞1, as well as the rotation sums of squared loadings of each components are 24.544%, 22.816%, 8.717%, 8.300%, 8.270%, 5.034%, 2.046%, respectively. The value of cumulative rotation sums of squared loadings is 79.726% ＞60% represents the cumulative percentage of the information content of the research item can be effectively extracted up to 79.726%, and 1 to 7 can be extracted as the main component.

Table 17 Total Variance Explained of Preliminary Study

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	54.873	62.355	62.355	54.873	62.355	62.355	21.599	24.544	24.544
2	6.060	6.887	69.242	6.060	6.887	69.242	20.078	22.816	47.360
3	2.724	3.095	72.337	2.724	3.095	72.337	7.671	8.717	56.077
4	2.521	2.865	75.202	2.521	2.865	75.202	7.304	8.300	64.377
5	1.638	1.861	77.064	1.638	1.861	77.064	7.277	8.270	72.646
6	1.304	1.481	78.545	1.304	1.481	78.545	4.429	5.034	77.680
7	1.039	1.181	79.726	1.039	1.181	79.726	1.801	2.046	79.726
8	0.875	0.994	80.721						
9	0.832	0.945	81.666						
10	0.789	0.897	82.563						
11	0.730	0.830	83.392						
12	0.660	0.750	84.142						
13	0.651	0.740	84.882						
14	0.582	0.662	85.544						
15	0.575	0.654	86.197						
16	0.548	0.623	86.820						
17	0.530	0.602	87.422						
18	0.495	0.563	87.985						
19	0.473	0.537	88.522						
20	0.456	0.518	89.040						
21	0.431	0.490	89.530						
22	0.410	0.466	89.997						
23	0.398	0.452	90.449						
24	0.381	0.433	90.881						
25	0.370	0.420	91.301						
26	0.358	0.407	91.709						
27	0.351	0.398	92.107						
28	0.343	0.390	92.496						
29	0.326	0.370	92.867						
30	0.307	0.349	93.216						
31	0.295	0.335	93.551						
32	0.278	0.315	93.866						
33	0.265	0.301	94.167						
34	0.256	0.290	94.458						

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
35	0.250	0.284	94.741						
36	0.239	0.272	95.013						
37	0.230	0.261	95.274						
38	0.211	0.240	95.514						
39	0.204	0.232	95.746						
40	0.203	0.231	95.978						
41	0.182	0.206	96.184						
42	0.173	0.197	96.381						
43	0.171	0.194	96.575						
44	0.164	0.187	96.762						
45	0.160	0.182	96.944						
46	0.154	0.175	97.118						
47	0.143	0.162	97.281						
48	0.138	0.156	97.437						
49	0.129	0.147	97.584						
50	0.126	0.143	97.727						
51	0.124	0.141	97.868						
52	0.114	0.129	97.997						
53	0.112	0.127	98.124						
54	0.109	0.124	98.249						
55	0.103	0.117	98.366						
56	0.097	0.110	98.476						
57	0.090	0.103	98.579						
58	0.087	0.098	98.677						
59	0.085	0.096	98.774						
60	0.077	0.087	98.861						
61	0.073	0.083	98.944						
62	0.070	0.079	99.023						
63	0.065	0.074	99.097						
64	0.062	0.070	99.167						
65	0.061	0.069	99.237						
66	0.058	0.066	99.303						
67	0.055	0.062	99.365						
68	0.050	0.057	99.421						
69	0.046	0.052	99.473						
70	0.045	0.051	99.525						

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
71	0.043	0.049	99.574						
72	0.040	0.045	99.619						
73	0.039	0.044	99.663						
74	0.036	0.041	99.705						
75	0.033	0.037	99.742						
76	0.031	0.036	99.777						
77	0.027	0.031	99.808						
78	0.025	0.028	99.836						
79	0.024	0.027	99.863						
80	0.021	0.024	99.887						
81	0.020	0.023	99.910						
82	0.017	0.019	99.929						
83	0.015	0.017	99.946						
84	0.012	0.014	99.960						
85	0.011	0.013	99.973						
86	0.010	0.011	99.985						
87	0.008	0.009	99.993						
88	0.006	0.007	100.000						
Extraction Method: Principal Component Analysis.									

Last but not the least, Table 18 shows the principle component analysis of preliminary study. The measure of MSR in section 2 is corresponding to 2.1-2.39, the factor loading which are more than 0.5 are with component 1 (2.7-2.39) and component 3 (2.1-2.7), which means that the measure needs to modify since they are not in the same component. The measure of SEAP in section 3 is consisting of 3.1-3.11, most of the factor loading are dropped in component 5, yet the situation of double factor loading is happened in 3.1, 3.2, 3.5, 3.6, 3.11. Hence, those measures need modification. The measure of SECM in section 4 is consisting of 4.1-4.15, the 4.1-4.7 is under component 6 and 4.8-4.15 is corresponding to component 4, which illustrated this part need modification to some extent. The measure of COI is from 5.1-5.23, all measures are arranged in component 2 and with high factor loading (factor loading $>$ 0.5), which represented that these 23 measures are measuring the same variable which is the COI.

Table 18 Rotated Component Matrix of Preliminary Study

204 Rotated Component Matrix[a]							
	Component						
	1	2	3	4	5	6	7
2.1 在项目立项阶段，政府提供了该项目给当地所带来的经济效益预测报告 During the project launch period, the government provided a forecast report on the economic benefits that the project would bring to the local area	0.415	0.226	0.642	0.137	0.080	0.230	0.068
2.2 在项目立项阶段，政府考量了该项目对每个参与人员的经济方面影响 During the project initiation phase, The government considered the financial impact of the project on everyone involved	0.325	0.248	0.734	0.141	0.197	0.191	0.049
2.3 在项目立项阶段，政府对项目的技术难度的可行性进行了分析 During the project launch period, the government analyzed the feasibility of the technical difficulties of the project	0.434	0.301	0.683	0.199	0.157	0.096	-0.112
2.4 在项目立项阶段，政府积极组织了公众参与，如公开听证会 During the project initiation phase, the government actively organized public participation, such as public hearings	0.380	0.255	0.736	0.176	0.177	0.159	-0.022
2.5 在项目立项阶段，政府考量了项目对环境、生态的影响，并且有环境评估报告（EIA） During the project initiation phase, The government considers the environmental and ecological impact of the project, and has the environmental assessment report (EIA)	0.449	0.188	0.713	0.221	0.166	0.065	-0.021
2.6 在项目立项阶段，政府考量了项目有尊重宗教、民族、文化的情况（如布施） In the project establishment stage, the government considers the situation that the project respects religion, nationality and culture (such as alms giving)	0.447	0.266	0.641	0.156	0.195	0.009	0.061
2.7 在项目立项阶段，媒体公正的报道了与项目有关的宣传活动的合法性 During the project establishment phase, the media fairly reported the legitimacy of the publicity activities related to the project	0.515	0.288	0.519	0.184	0.183	0.069	0.387

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
2.8 在项目立项阶段，媒体跟进了与项目有关的伦理道德及环境问题 During the project establishment stage, the media always paid attention to the ethical and environmental issues related to the project	0.510	0.278	0.500	0.189	0.176	0.093	0.376
2.9 在项目立项阶段，媒体跟进了社区与公众的需求 During the project initiation stage, the media paid attention to the needs of the community and the public	0.539	0.275	0.470	0.158	0.185	0.070	0.376
2.10 在项目设计阶段，设计方在采用了在保证设计质量的情况下的经济最优的设计理念 In the design stage of the project, the designer adopts the economical optimal design concept under the condition of ensuring the design quality	0.561	0.241	0.448	0.245	0.177	0.087	0.281
2.11 在项目设计阶段，设计方考量了项目在创新和科技进步上的情况 In the design stage of the project, the designer considers the project's innovation and technological progress	0.576	0.234	0.472	0.249	0.171	0.084	0.284
2.12 在项目设计阶段，设计方积极使用了可持续设计及绿色设计理念 In the design stage of the project, the designer actively uses the concept of sustainable design and green design	0.593	0.261	0.423	0.215	0.116	0.011	0.403
2.13 在项目设计阶段，设计方采用对以社区为中心的设计理念 In the design phase of the project, the designer adopts the concept of community-centered design	0.608	0.228	0.421	0.223	0.191	0.108	0.340
2.14 在项目设计阶段，政府有公开项目的设计方案 During the project design stage, the government made public the project design scheme	0.559	0.224	0.453	0.178	0.259	0.136	0.376
2.15 在项目设计阶段，政府有积极听取公众对设计方案提出的建议 During the design phase of the project, the Government actively listened to the public's suggestions on the design scheme	0.600	0.241	0.391	0.203	0.137	0.113	0.407
.16 在项目设计阶段，政府有对项目的设计成本进行监管 In the project design stage, the government supervises the design cost of the project	0.658	0.289	0.415	0.225	0.092	0.130	0.115

204 Rotated Component Matrix[a]							
	Component						
	1	2	3	4	5	6	7
2.17 在项目建设阶段，项目法人对工程质量和安全施工进行了监控 During the construction phase of the project, the project legal person shall monitor the project quality and safety construction	0.724	0.258	0.323	0.236	0.147	0.089	0.062
2.18 在项目建设阶段，项目法人确保了资金安全及合理回报 During the construction phase of the project, the project legal person ensures the security of funds and reasonable returns	0.736	0.292	0.242	0.213	0.152	0.180	0.159
2.19 在项目建设阶段，项目法人采纳了绿色建造理念 In the construction phase of the project, the project legal person adopts the concept of green construction	0.716	0.285	0.268	0.173	0.132	0.131	0.191
2.20 在项目建设阶段，项目法人积极注重周边社区及公众的需求 2.20 During the construction phase of the project, the project legal person shall pay active attention to the needs of the surrounding communities and the public	0.661	0.300	0.264	0.132	0.089	0.211	0.303
2.21 在项目建设阶段，承包商控制了工程的成本和工期 During the construction phase of the Project, the Contractor strictly controlled the cost and duration of the Project	0.658	0.306	0.310	0.199	0.207	0.099	0.206
2.22 在项目建设阶段，承包商有对施工技术进行创新改进 During the construction phase of the project, the contractor innovates and improves the construction technology	0.728	0.313	0.235	0.149	0.189	0.184	0.065
2.23 在项目建设阶段，承包商对施工阶段的资源进行了合理循环利用 During the construction phase of the project, the contractor has carried out reasonable recycling and utilization of resources in the construction phase	0.734	0.320	0.207	0.229	0.182	0.185	0.081
2.24 在项目建设阶段，承包商遵守了法律法规及行业规范 During the construction phase of the Project, the Contractor complied with laws, regulations and industry norms	0.770	0.318	0.228	0.146	0.210	0.150	-0.032

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
.25 在项目建设阶段，承包商确保了工程质量和施工安全 During the construction phase of the Project, the Contractor ensured the quality of the Works and construction safety	0.725	0.222	0.319	0.140	0.237	0.118	-0.070
2.26 在项目建设阶段，承包商对工地周边的社区、地区采取了生态环境保护措施 During the construction phase of the project, the contractor took measures to protect the ecological environment of the surrounding communities and areas	0.691	0.300	0.157	0.178	0.271	0.224	0.034
2.27 在项目建设阶段，承包商有积极维护工地周边社区关系 During the construction phase of the project, the contractor actively maintains the community relations around the site	0.726	0.282	0.141	0.134	0.282	0.186	0.105
2.28 在项目建设阶段，承包商有积极处理施工紧急公共事件 During the construction phase of the project, the contractor actively deals with emergency public events during construction	0.733	0.372	0.138	0.132	0.189	0.153	0.053
2.29 在项目建设阶段，监理方有对工程质量和安全进行监督 During the construction phase of the project, the supervisor shall supervise the project quality and safety	0.768	0.380	0.091	0.176	0.183	0.045	-0.061
2.30 在项目建设阶段，监理方有对项目施工员工的权益监督 During the construction phase of the project, the supervisor shall supervise the rights and interests of the project construction staff	0.727	0.370	0.179	0.134	0.237	0.060	0.066
2.31 在项目建设阶段，监理方有对项目的环境保护措施进行监督 During the construction phase of the project, the supervisor shall supervise the environmental protection measures of the project	0.759	0.318	0.144	0.227	0.276	0.095	-0.085
2.32 在项目建设阶段，供应商有保障施工材料的质量 In the construction phase of the project, the supplier shall guarantee the quality of construction materials	0.752	0.413	0.140	0.156	0.189	0.165	-0.043

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
2.33 在项目建设阶段，供应商有积极推广及使用绿色材料 In the construction phase of the project, the supplier actively promotes and uses green materials	0.731	0.313	0.135	0.204	0.334	0.153	0.045
2.34 在项目运营阶段，运营商有对工程进行日常维护 During the operation phase of the project, The operator carries out routine maintenance on the project	0.632	0.431	0.260	0.178	0.343	0.107	-0.007
2.35 在项目运营阶段，运营商有控制工程的运营成本和质量 In the project operation stage, the operator shall control the operation cost and quality of the project	0.707	0.355	0.241	0.170	0.313	0.066	-0.010
2.36 在项目运营阶段，运营商有遵守法律、行业规范及合同约定 During the operation phase of the project, the operator shall comply with laws, industry norms and contract provisions	0.718	0.355	0.235	0.169	0.258	0.103	-0.059
2.37 在项目运营阶段，运营商有对资源进行合理利用 In the operation stage of the project, the operator makes reasonable use of resources	0.684	0.371	0.255	0.199	0.354	0.065	-0.002
2.38 在项目运营阶段，运营商有对社区、地区生态环境进行保护 In the project operation stage, the operator has to protect the community and regional ecological environment	0.668	0.386	0.223	0.211	0.312	0.110	0.021
2.39 在项目运营阶段，运营商有积极维护与社区的关系 In the operation phase of the project, the operator actively maintains the relationship with the community	0.686	0.317	0.244	0.264	0.339	0.093	-0.023
3.1 有注意承包商/分包商是否使用了环保的建筑材料 There are concerns about the use of environmentally friendly building materials by contractors/subcontractors	0.509	0.308	0.229	0.114	0.557	0.195	0.081
3.2 有注意承包商/分包商定是否期将垃圾堆放在指定位置 There is concern that the contractor/subcontractor will agree to place the garbage dump in the designated location	0.539	0.316	0.193	0.142	0.559	0.166	-0.006

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
3.3 有注意承包商/分包商是否将运输车辆重新干净后再上马路 There is concern about whether the contractor/subcontractor has cleaned the transport vehicles before driving on the road	0.488	0.288	0.194	0.191	0.583	0.105	0.093
3.4 有注意项目相关人员是否定期参与环境保护教育 There are concerns about whether people involved in the project regularly participate in environmental protection education	0.438	0.280	0.157	0.233	0.659	0.098	0.190
3.5 有注意政府是否在各个区域定点设定了垃圾桶 There are concerns about whether the government has targeted garbage bins in various areas	0.515	0.333	0.201	0.147	0.548	0.134	-0.041
3.6 有注意政府是否制定了保护环境政策及措施并实施，且在这个过程中我能学到很多环境保护知识 There are concerns about whether the government has formulated and implemented environmental protection policies and measures. In this process, I can learn a lot of environmental protection knowledge	0.501	0.322	0.170	0.207	0.611	0.136	-0.003
3.7 有注意政府、媒体等是否积极宣传环境保护的重要性，会给项目提出自己对环境保护的建议 There are concerns about whether the government media actively publicize the importance of environmental protection, and put forward my own suggestions on environmental protection to the project	0.451	0.319	0.207	0.158	0.631	0.180	0.055
3.8 有注意媒体是否对环境保护措施做得好的企业或个人进行公开表彰 There are concerns about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures	0.423	0.367	0.155	0.177	0.646	0.145	0.075
3.9 有注意项目法人、承包商等是否积极采用绿色设计，如使用太阳能、风能等 Pay attention to whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy, etc	0.484	0.277	0.169	0.157	0.637	0.188	0.035

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
3.10 给项目有关人员提出自己对他们所做的保护环境工作的看法 Give your opinion to the people involved in the project about what they are doing to protect the environment	0.389	0.291	0.145	0.211	0.700	0.162	0.104
3.11 有注意群众自觉进行垃圾分类投放，不乱丢垃圾 There are concerns about people consciously classify garbage and do not litter	0.517	0.307	0.174	0.226	0.516	0.240	-0.081
4.1 噪音污染 Noise pollution	0.192	0.407	0.134	0.229	0.233	0.736	0.053
4.2 废水废气污染 Waste water and waste gas pollution	0.227	0.458	0.207	0.252	0.231	0.645	-0.015
4.3 粉尘污染 Dust pollution	0.248	0.477	0.110	0.271	0.111	0.679	0.046
4.4 废弃物污染 Solid waste pollution	0.246	0.426	0.164	0.354	0.204	0.591	0.139
4.5 光污染 Light pollution	0.256	0.446	0.147	0.379	0.180	0.584	-0.022
4.6 有毒有害废弃物的排放 Discharge of toxic and hazardous wastes	0.239	0.431	0.240	0.389	0.253	0.532	-0.007
4.7 其他污染 Other pollution	0.239	0.405	0.130	0.429	0.226	0.461	0.083
4.8 公众自觉守护环境卫生 The public consciously protects environmental hygiene	0.240	0.364	0.213	0.655	0.242	0.165	-0.020
4.9 环保专家积极推动环保活动 Environmental experts actively promote environmental protection activities	0.226	0.426	0.219	0.655	0.206	0.132	0.190
4.10 企业改进生产工艺、制造等技术减少对环境的污染 The enterprise shall improve the production process and manufacturing technology to reduce environmental pollution	0.248	0.414	0.228	0.660	0.220	0.230	0.052
4.11 企业提升能源使用效率 Companies improve energy efficiency	0.278	0.407	0.136	0.722	0.193	0.209	0.022
4.12 建立以政府投入为主、全社会支持生态环境建设的投资融资体制 An investment and financing system with government investment as the main component and the whole society supporting ecological environment construction shall be established	0.278	0.436	0.184	0.686	0.154	0.149	0.062
4.13 政府支持替代能源的生产和使用 The government supports the production and use of alternative energy sources	0.307	0.389	0.199	0.719	0.124	0.223	0.025
4.14 政府制定的环境保护税收政策 The	0.322	0.387	0.223	0.668	0.137	0.199	0.083

204 Rotated Component Matrix[a]							
	Component						
	1	2	3	4	5	6	7
government formulates tax policies for environmental protection							
4.15 研究者为完善环境补偿措施提供的科技和理论支撑 Scientific and theoretical support provided by researchers for improving environmental compensation measures	0.293	0.411	0.131	0.719	0.107	0.181	0.075
5.1 企业愿意积极改进国际化运营方法，如设办事处、子公司或合资公司等 Company is willing to actively improve the international operation methods. Such as offices, subsidiaries or joint venture companies	0.260	0.681	0.098	0.281	0.215	0.191	-0.001
5.2 企业愿意承担和把握国际化过程中的风险和机遇 Company is willing to undertake and grasp the risks and opportunities in the process of internationalization	0.252	0.716	0.051	0.307	0.148	0.216	-0.018
5.3 企业愿意参与国际化分工与合作，如与外商签订分工合同，联合生产等 Enterprises are willing to participate in the international division of labor and cooperation, such as the division of labor contracts with foreign companies, joint production, etc	0.275	0.740	0.174	0.268	0.135	0.150	-0.044
5.4 国内市场经济变革促使企业需要参与国际化经营 The reform of domestic market economy urges enterprises to participate in international operation	0.321	0.773	0.168	0.240	0.138	0.104	-0.061
5.5 国际环境的需求为企业国际化发展提供了市场 The demand of international environment provides a market for the internationalization development of enterprises	0.354	0.767	0.129	0.179	0.131	0.030	0.021
5.6 国际合作倡议的国家政策有利于企业海外发展 The national policies of the International Cooperation Initiative are conducive to the overseas development of enterprises	0.367	0.768	0.146	0.172	0.052	0.044	-0.047

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
5.7 参与国际合作倡议的国家政府为本企业国际经营提供了便利 The governments of countries participating in international cooperation initiatives provide convenience for the international operation of the Company	0.300	0.774	0.170	0.191	0.096	0.067	0.039
5.8 企业有能力利用国内市场资源 The enterprise has the ability to utilize domestic market resources	0.358	0.783	0.165	0.173	0.061	0.135	0.045
5.9 企业有能力利用国外市场资源 The enterprise has the ability to utilize foreign market resources	0.300	0.737	0.164	0.208	0.194	0.078	0.084
5.10 企业能够利用国内政府政策资源 Enterprises can take advantage of domestic government policy resources	0.378	0.736	0.096	0.184	0.140	0.133	0.117
5.11 企业能够利用国外政策政府资源 Enterprises can make use of foreign policy and government resources	0.324	0.787	0.098	0.192	0.169	0.167	0.059
5.12 企业很熟悉和遵循东道国的法律和市场管理规范 The enterprise is familiar and follows the laws and market management norms of the host country	0.176	0.771	0.277	0.151	0.221	0.264	0.116
5.13 企业能够敏锐洞察到国际市场的变化并把握机会 The enterprise can keenly perceive changes in the international market and grasp opportunities	0.281	0.733	0.126	0.192	0.226	0.131	0.101
5.14 企业与东道国的政府机构联系紧密，能获得支持 The enterprise has close links with the government agencies of the host country and can get support	0.217	0.734	0.224	0.168	0.265	0.206	0.102
5.15 企业考虑国外新的供应商和客户 The enterprise considers new foreign suppliers and customers	0.306	0.768	0.049	0.141	0.204	0.187	0.212
5.16 企业知道国际经营环境高风险的特点，注重采取谨慎、渐进的方法 The enterprise is aware of the characteristics of high risks in the international business environment and attaches importance to a cautious and gradual approach	0.219	0.758	0.199	0.176	0.252	0.197	0.127
5.17 企业参与国际市场的进出口活动 The enterprise participates in import and export activities in the international market	0.292	0.759	0.190	0.108	0.191	0.167	0.039

204 Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
5.18 企业与国际市场进行人力资源交流活动 The enterprise conduct human resources exchange activities with the international market	0.290	0.707	0.218	0.181	0.226	0.195	0.076
5.19 企业积极探索国外其他企业的经营合作 The Company actively explore business cooperation with other foreign enterprises	0.320	0.690	0.181	0.294	0.185	0.172	-0.003
5.20 企业在参加国际合作的过程中提升了生产力 Enterprises improve productivity in the process of participating in international cooperation	0.341	0.751	0.154	0.231	0.185	0.139	0.060
5.21 企业参与国际合作的过程中获得了较高的财务收益 Enterprises obtain higher financial benefits in the process of participating in international cooperation	0.226	0.725	0.274	0.198	0.231	0.101	0.056
5.22 企业员工对企业从事的国际化经营活动认可度高 Employees have a high degree of recognition for the international business activities of the enterprise	0.269	0.744	0.181	0.211	0.141	0.144	0.095
5.23 海外客户对企业从事的国际化经营活动认可度高 Overseas customers have a high degree of recognition for the company's international business activities	0.244	0.735	0.248	0.170	0.248	0.204	0.082

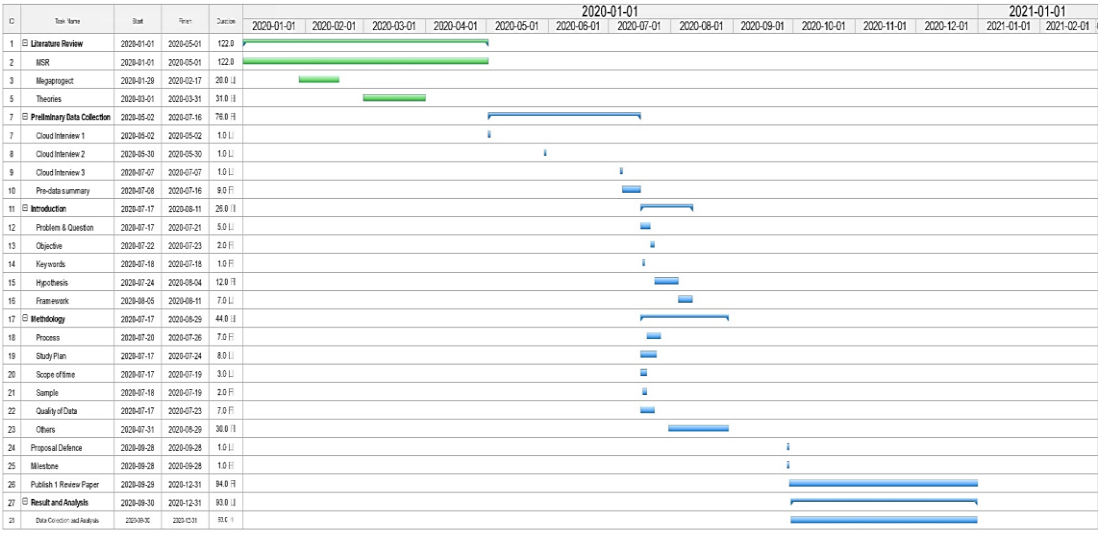
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Conclusion

In this chapter, the preparation of the final study was illustrated. The feedbacks and suggestions from experts and preliminary data were collected by preliminary study. It demonstrated the development of the research questionnaire from expert's verification to the pretest from pilot study through reliability test and validity test by using scientific research instrument of Cronbach Alpha and factor analysis respectively. Following by the administration and modification of the main questionnaire. The next chapter will discuss the data analysis.

Study Plan



ID	Task Name	Start	Finish	Duration
1	**Literature Review**	2020-01-01	2020-05-01	122.0
2	MSR	2020-01-01	2020-05-01	122.0
3	Megaproject	2020-01-29	2020-02-17	20.0
5	Theories	2020-03-01	2020-03-31	31.0
7	**Preliminary Data Collection**	2020-05-02	2020-07-16	76.0
7	Cloud Interview 1	2020-05-02	2020-05-02	1.0
8	Cloud Interview 2	2020-05-30	2020-05-30	1.0
9	Cloud Interview 3	2020-07-07	2020-07-07	1.0
10	Pre-data summary	2020-07-08	2020-07-16	9.0
11	**Introduction**	2020-07-17	2020-08-11	26.0
12	Problem & Question	2020-07-17	2020-07-21	5.0
13	Objective	2020-07-22	2020-07-23	2.0
14	Keywords	2020-07-18	2020-07-18	1.0
15	Hypothesis	2020-07-24	2020-08-04	12.0
16	Framework	2020-08-05	2020-08-11	7.0
17	**Methodology**	2020-07-17	2020-08-29	44.0
18	Process	2020-07-20	2020-07-26	7.0
19	Study Plan	2020-07-17	2020-07-24	8.0
20	Scope of time	2020-07-17	2020-07-19	3.0
21	Sample	2020-07-18	2020-07-19	2.0
22	Quality of Data	2020-07-17	2020-07-23	7.0
23	Others	2020-07-31	2020-08-29	30.0
24	Proposal Defence	2020-09-28	2020-09-28	1.0
25	Milestone	2020-09-28	2020-09-28	1.0
26	Publish 1 Review Paper	2020-09-29	2020-12-31	94.0
27	**Result and Analysis**	2020-09-30	2020-12-31	93.0
28	Data Collection and Analysis	2020-09-30	2020-12-31	93.0

Figure 11 Study Plan

CHAPTER IV

DATA ANALYSIS

Introduction

After the preliminary study, researchers integrated all feedback and comments from the pilot study, such as not understanding the questions, not being able to answer the questions, similar questions and long questions. The data analysis in this chapter demonstrates the relationship between MSR and SECM by using SPSS 26.0, AMOS 26 Graphic, and GraphPad Prism 9.0.

Descriptive Analysis

A total of 458 questionnaires were issued, after eliminating invalid questionnaires, finally 398 questionnaires were collected. As can be seen from the Table 19 below, the summary of demography statistics data. 41.0% of the samples selected "Female". In addition, the proportion of Male samples was 59.0%. From 1.2 What's your religion, more than 31.7% of the samples are "No religion" and 44.7% are “Buddhism”. 56.8% of the samples will choose "I'm not in that line of work". And the proportion of 1-5 years samples is 31.2%. From 1.4 Please specify your highest education, more than 50% of the samples are "Bachelor". For 1.5 Are you familiar with social responsibility, "A little understanding" accounted for 51.8%. For Mass media such as newspapers and television, the proportion of "selected" is 68.3%. The percentage of unselected samples was 31.6%. Network in the Internet, more than 50% of the samples selected "selected" and the proportion of unselected samples is 40.5%. More than 50% of the samples in Training and Learning choose "not selected". In addition, the proportion of selected samples was 45.1%. From Social occasions, most samples are "unselected", and the proportion is 55.5%, the rest of

44.5% samples were selected. From the perspective of Others, there are relatively high "unselected" in the sample, accounting for 75.1%. From 1.7 For megaprojects, which of the following groups do you belong to? It can be seen that "community or public" is relatively more in the sample, accounting for 53.0%.

Table 19 Summary of Demography Statistics Data

Questions	Options	Frequency	Percentage (%)	Cumulative Percentage (%)
1.1 您的性别? Your gender is?	男 Male	235	59.0	59.0
	女 Female	163	41.0	100.0
1.2 您是否有宗教信仰？ What's your religion	佛教 Buddhism	178	44.7	44.7
	伊斯兰教 Islam	7	1.8	46.5
	基督教 Christian	5	1.3	47.7
	无宗教信仰 No Religion	126	31.7	79.4
	其他 Other	82	20.6	100.0
1.3 您在大型项目行业工作了多少年? How many years have you worked in the megaproject industry?	1-5 年 years	124	31.2	31.2
	6-10 年 years	28	7.0	38.2
	大于10年 More than 10 years	20	5.0	43.2
	我不从事该行业 I'm not in that line of work	226	56.8	100.0
1.4 您的最高学历是? Please specify your highest education?	博士 Ph.D	17	4.3	4.3
	硕士 Master	45	11.3	15.6
	学士 Bachelor	233	58.5	74.1
	大专 Diploma/College	56	14.1	88.2
	高中 High school	43	10.8	99.0
	高中以下 Under the high school	4	1.0	100.0
1.5 您对社会责任熟悉吗? Are you familiar with social responsibility?	从来没有听说过 Never heard at all	18	4.5	4.5
	有一点了解 A little understanding	206	51.8	56.3
	有清晰了解 Have clear understanding	105	26.4	82.7
	知道的较多 Know more about this	50	12.6	95.2
	非常熟悉 Very familiar	19	4.8	100.0

Questions	Options	Frequency	Percentage (%)	Cumulative Percentage (%)
大众媒体，如报纸和电视 Mass media such as newspapers and television	unselected	126	31.7	31.7
	selected	272	68.3	100.0
网络 Internet	unselected	161	40.5	40.5
	selected	237	59.5	100.0
培训与学习 Training and learning	unselected	215	54.0	54.0
	selected	183	46.0	100.0
社交场合 Social occasions	unselected	221	55.5	55.5
	selected	177	44.5	100.0
其他 Others	unselected	299	75.1	75.1
	selected	99	24.9	100.0
1.7 您在参与大型工程项目当中属于以下哪个角色？ For megaprojects, which of the following groups do you belong to?	中国承包商/分包商 Chinese contractor or Sub-contractor	81	20.4	20.4
	中央政府或地方政府 The central government or local government	21	5.3	25.6
	设计方 Designer	21	5.3	30.9
	分包商 local sub-contractor	12	3.0	33.9
	项目法人 project legal	7	1.8	35.7
	供应商 supplier	9	2.3	37.9
	项目监理 project supervision	21	5.3	43.2
	非营利性组织 NGO	8	2.0	45.2
	媒体 media	7	1.8	47.0
	社区群众 community or public	211	53.0	100.0
Total		398	100	100

Table 20 illustrates the current situation analysis result and figure 13 clearly presents the distribution of results. As shown in the scale, the mean of MSR is 3.736, illustrates that megaprojects are quite care of social responsibility nowadays, the scale of MSR from 1 to 5 is '1 = don't have', '2 = rare', '3 = normal', '4 = often', and '5 = always'. From 1 to 5 for SEAP is from '1 = don't have' to '5 = always', the mean of SEAP is 3.693 nearly 4 (2 = rare, 3 = normal, 4 = often), representing that the environmental activities for stakeholder participation is normal and nearly often,

people's awareness of environmental protection has improved. For SECM, the scale from 1 to 5 represents '1 = unsatisfied at all' to '5 = very satisfy'. The mean of SECM is 3.588 demonstrates the public satisfaction on environment is still normal and there is a gap need to be improved to achieve satisfy and substantial efforts are required to attain very satisfy, the scale of SECM is from '1 = unsatisfied at all' to '5 = very satisfy'. The mean value of COI is 3.642, represents that certain types of internationalization criteria, operations, and knowledges need to be popularized. The scale of COI is from '1 = disagree at all' to '5 = agree at all'.

Results shown in figure 14 illustrated that the stakeholders' satisfaction of environmental compensation is not very ideal, with a score between 3 and 4, which is still far from 4 and there is still room for improvement. Therefore, how to improve and solve above problems is urgent need, which further illustrates the importance of this research.

Table 20 Descriptive Statistics of Final Data by Dimensions

	N	Minimum	Maximum	Mean	Std. Deviation
MSR	398	1.00	5.00	3.736	.907
SEAP	398	1.00	5.00	3.693	.925
SECM	398	1.00	5.00	3.588	.816
COI	398	1.00	5.00	3.642	.760

Source: Author

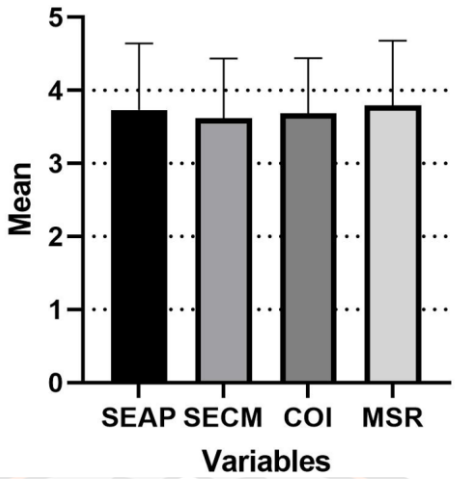


Figure 12 Descriptive Data of Variables by Mean

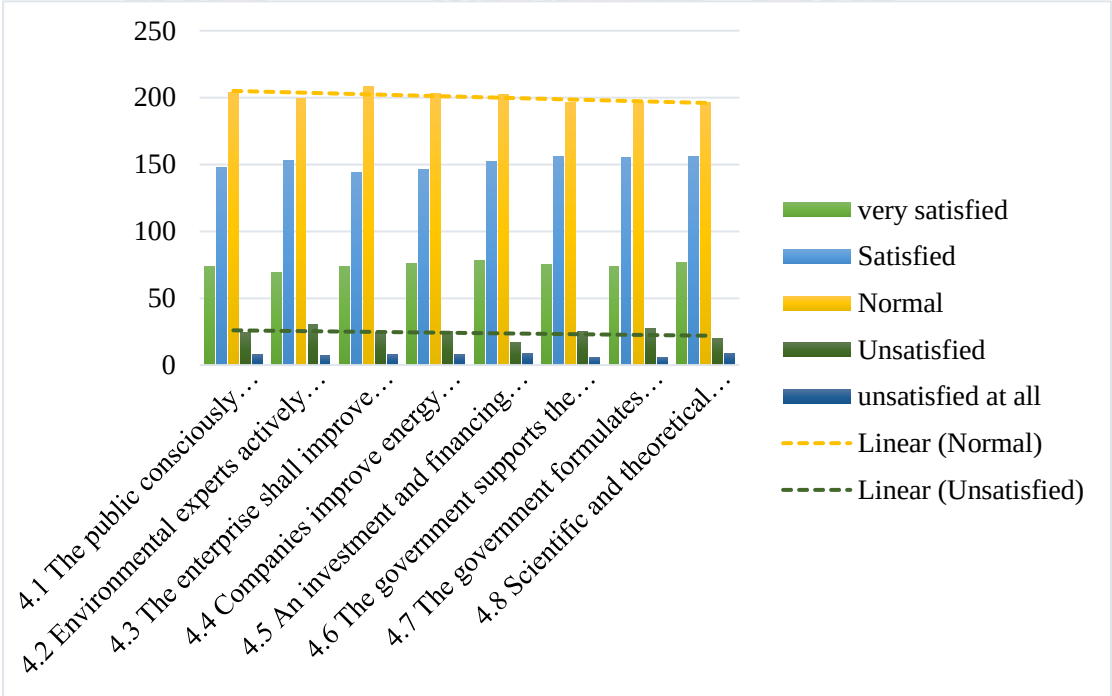


Figure 13 Current Situation of SECM

Table 21 shows the descriptive statistics of 458 participants in details specifically. There were no outliers in the data, following by the mean analysis was performed. **Dependent variable**: SECM (4.1-4.8), there was not much difference

between the mean values of each item, among which the mean value of item 4.5 was the largest, which is 3.60. **Independent variable**: MSR (2.1-2.39) is divided into four periods for measurement. MSR-initiation (MSR-IN), with the highest mean value of 3.64 in item 2.5 (EIA). MSR-design (MSR-DE), with the highest mean value of 3.71 in item 2.12 (concept of sustainability and green design). MSR-construction (MSR-CON), with the highest mean value of 3.83 in item 2.25 (contractor ensured the quality of the works and construction safety). MSR-operation (MSR-OP), with the highest mean value of 3.82 in item 2.36 (the operator should comply with laws, industry norms and contract provisions). **Mediator**: SEAP (3.1-3.11) with the highest mean value of 3.73 in item 3.5 (concerns about whether the government has targeted garbage bins in various areas). **Moderator**: COI (5.1-5.23) is divided into six aspects of measurement. COI-international attitude (COI-AI), with the highest mean value of 3.63 in item 5.3 (international division of labor and cooperation). COI-subjective norm (COI-SU) with similar mean value from 3.63 to 3.65. COI-perceived behavioral control (COI-PBC) with a mean value of 3.62. 3.60, and 3.55. COI-dual cognitive (COI-DC) with a highest mean value of 3.62 in term 5.12 (laws and market management norms of the host country) and 5.16 (the characteristics of high risks in the international business and attaches gradual approach), but the lowest mean value of 3.55 in term 5.13 (the enterprise can keenly perceive changes in the international market and grasp opportunities). COI-internationalization behavior (COI-IB) with the highest value of 3.66 of item 5.18 (human resources exchange activities with the international market). COI-internationalization performance (COI-IP) with the highest mean value of 3.64 of item 5.20 (enterprises improve productivity in the process of participating in international cooperation).

Table 21 Descriptive Statistics of Final Data by Items

		N	Minimum	Maximum	Mean	Std. Deviation
MSR-IS	2.1 在项目立项阶段，政府提供了该项目给当地所带的经济效益预测报告 During the project launch period, the government provided a forecast report on the economic benefits that the project would bring to the local area	398	1	5	3.59	1.127
MSR-IS	2.3 在项目立项阶段，政府对项目的技术难度的可行性进行了分析 During the project launch period, the government analyzed the feasibility of the technical difficulties of the project	398	1	5	3.68	1.093
MSR-IS	2.5 在项目立项阶段，政府考量了项目对环境、生态的影响，并且有环境评估报告（EIA） During the project initiation phase, The government considers the environmental and ecological impact of the project, and has the environmental assessment report (EIA)	398	1	5	3.68	1.109

		N	Minimum	Maximum	Mean	Std. Deviation
MSR-IS	2.6 在项目立项阶段，政府考量了项目有尊重宗教、民族、文化的情况（如布施） In the project establishment stage, the government considers the situation that the project respects religion, nationality and culture (such as alms giving)	398	1	5	3.60	1.079
MSR-IS	2.7 在项目立项阶段，媒体公正的报道了与项目有关的宣传活动的合法性 During the project establishment phase, the media fairly reported the legitimacy of the publicity activities related to the project	398	1	5	3.64	1.077
MSR-IS	2.8 在项目立项阶段，媒体跟进了与项目有关的伦理道德及环境问题 During the project establishment stage, the media always paid attention to the ethical and environmental issues related to the project	398	1	5	3.59	1.077
MSR-IS	2.9 在项目立项阶段，媒体跟进了社区与公众的需求 During the project initiation stage, the media	398	1	5	3.62	1.025

		N	Minimum	Maximum	Mean	Std. Deviation
	paid attention to the needs of the community and the public					
MSR-DS	2.10 在项目设计阶段，设计方在采用了在保证设计质量的情况下的经济最优的设计理念 In the design stage of the project, the designer adopts the economical optimal design concept under the condition of ensuring the design quality	398	1	5	3.72	1.079
MSR-DS	2.11 在项目设计阶段，设计方考量了项目在创新和科技进步上的情况 In the design stage of the project, the designer considers the project's innovation and technological progress	398	1	5	3.70	1.020
MSR-DS	2.15 在项目设计阶段，政府有积极听取公众对设计方案提出的建议 During the design phase of the project, the Government actively listened to the public's suggestions on the design scheme	398	1	5	3.65	1.039
MSR-CS	2.18 在项目建设阶段，项目法人确保了资金安	398	1	5	3.72	1.047

		N	Minimum	Maximum	Mean	Std. Deviation
	全及合理回报 During the construction phase of the project, the project legal person ensures the security of funds and reasonable returns					
MSR-CS	2.19 在项目建设阶段，项目法人采纳了绿色建造理念 In the construction phase of the project, the project legal person adopts the concept of green construction	398	1	5	3.75	1.040
MSR-CS	2.20 在项目建设阶段，项目法人积极注重周边社区及公众的需求 2.20 During the construction phase of the project, the project legal person shall pay active attention to the needs of the surrounding communities and the public	398	1	5	3.72	1.043
MSR-CS	2.22 在项目建设阶段，承包商有对施工技术进行创新改进 During the construction phase of the project, the contractor innovates and improves the construction technology	398	1	5	3.74	1.025
MSR-CS	2.24 在项目建设阶段，	398	1	5	3.86	1.052

		N	Minimum	Maximum	Mean	Std. Deviation
	承包商遵守了法律法规及行业规范 During the construction phase of the Project, the Contractor complied with laws, regulations and industry norms					
MSR-CS	2.25 在项目建设阶段，承包商确保了工程质量和施工安全 During the construction phase of the Project, the Contractor ensured the quality of the Works and construction safety	398	1	5	3.90	1.029
MSR-CS	2.26 在项目建设阶段，承包商对工地周边的社区、地区采取了生态环境保护措施 During the construction phase of the project, the contractor took measures to protect the ecological environment of the surrounding communities and areas	398	1	5	3.81	1.032
MSR-CS	2.28 在项目建设阶段，承包商有积极处理施工紧急公共事件 During the construction phase of the project, the contractor actively deals with emergency public events during construction	398	1	5	3.76	1.053

		N	Minimum	Maximum	Mean	Std. Deviation
MSR-CS	2.30 在项目建设阶段，监理方有对项目施工员工的权益监督 During the construction phase of the project, the supervisor shall supervise the rights and interests of the project construction staff	398	1	5	3.80	1.067
MSR-CS	2.31 在项目建设阶段，监理方有对项目的环境保护措施进行监督 During the construction phase of the project, the supervisor shall supervise the environmental protection measures of the project	398	1	5	3.80	1.060
MSR-CS	2.32 在项目建设阶段，供应商有保障施工材料的质量 In the construction phase of the project, the supplier shall guarantee the quality of construction materials	398	1	5	3.80	1.051
MSR-CS	2.33 在项目建设阶段，供应商有积极推广及使用绿色材料 In the construction phase of the project, the supplier actively promotes and uses green materials	398	1	5	3.76	1.033

		N	Minimum	Maximum	Mean	Std. Deviation
MSR-OS	2.34 在项目运营阶段，运营商有对工程进行日常维护 During the operation phase of the project, The operator carries out routine maintenance on the project	398	1	5	3.83	1.005
MSR-OS	2.36 在项目运营阶段，运营商有遵守法律、行业规范及合同约定 During the operation phase of the project, the operator shall comply with laws, industry norms and contract provisions	398	1	5	3.88	1.052
MSR-OS	2.38 在项目运营阶段，运营商有对社区、地区生态环境进行保护 In the project operation stage, the operator has to protect the community and regional ecological environment	398	1	5	3.77	1.046
MSR-OS	2.39 在项目运营阶段，运营商有积极维护与社区的关系 In the operation phase of the project, the operator actively maintains the relationship with the community	398	1	5	3.78	1.046

		N	Minimum	Maximum	Mean	Std. Deviation
	3.1 有注意承包商/分包商是否使用了环保的建筑材料 There are concerns about the use of environmentally friendly building materials by contractors/ subcontractors	398	1	5	3.70	1.036
	3.2 有注意承包商/分包商定是否期将垃圾堆放在指定位置 There is concern that the contractor/ subcontractor will agree to place the garbage dump in the designated location	398	1	5	3.69	1.038
	3.3 有注意承包商/分包商是否将运输车辆重新干净后再上马路 There is concern about whether the contractor/ subcontractor has cleaned the transport vehicles before driving on the road	398	1	5	3.71	1.048
	3.4 有注意项目相关人员是否定期参与环境保护教育 There are concerns about whether people involved in the project regularly participate in environmental protection education	398	1	5	3.66	1.057

		N	Minimum	Maximum	Mean	Std. Deviation
	3.5 有注意政府是否在各个区域定点设定了垃圾桶 There are concerns about whether the government has targeted garbage bins in various areas	398	1	5	3.78	1.042
	3.6 有注意政府是否制定了保护环境政策及措施并实施，且在这个过程中我能学到很多环境保护知识 There are concerns about whether the government has formulated and implemented environmental protection policies and measures. In this process, I can learn a lot of environmental protection knowledge	398	1	5	3.71	1.044
	3.7 有注意政府、媒体等是否积极宣传环境保护的重要性，会给项目提出自己对环境保护的建议 There are concerns about whether the government media actively publicize the importance of environmental protection, and put forward my own	398	1	5	3.72	1.059

		N	Minimum	Maximum	Mean	Std. Deviation
	suggestions on environmental protection to the project					
	3.8 有注意媒体是否对环境保护措施做得好的企业或个人进行公开表彰 There are concerns about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures	398	1	5	3.64	1.055
	3.9 有注意项目法人、承包商等是否积极采用绿色设计，如使用太阳能、风能等 Pay attention to whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy, etc	398	1	5	3.70	0.995
	3.10 给项目有关人员提出自己对他们所做的保护环境工作的看法 Give your opinion to the people involved in the project about what they are doing to protect the environment	398	1	5	3.64	1.081
	3.11 有注意群众自觉进行垃圾分类投放，不乱	398	1	5	3.68	1.048

		N	Minimum	Maximum	Mean	Std. Deviation
	丢垃圾 There are concerns about people consciously classify garbage and do not litter					
	4.1 公众自觉守护环境卫生 The public consciously protects environmental hygiene	398	1	5	3.57	0.900
	4.2 环保专家积极推动环保活动 Environmental experts actively promote environmental protection activities	398	1	5	3.56	0.895
	4.3 企业改进生产工艺、制造等技术减少对环境的污染 The enterprise shall improve the production process and manufacturing technology to reduce environmental pollution	398	1	5	3.57	0.900
	4.4 企业提升能源使用效率 Companies improve energy efficiency	398	1	5	3.58	0.913
	4.5 建立以政府投入为主、全社会支持生态环境建设的投资融资体制 An investment and financing system with government investment as the main component and the whole society	398	1	5	3.62	0.895

		N	Minimum	Maximum	Mean	Std. Deviation
	supporting ecological environment construction shall be established					
	4.6 政府支持替代能源的生产和使用 The government supports the production and use of alternative energy sources	398	1	5	3.61	0.884
	4.7 政府制定的环境保护税收政策 The government formulates tax policies for environmental protection	398	1	5	3.59	0.887
	4.8 研究者为完善环境补偿措施提供的科技和理论支撑 Scientific and theoretical support provided by researchers for improving environmental compensation measures	398	1	5	3.61	0.907
COI-IA	5.1 企业愿意积极改进国际化运营方法，如设办事处、子公司或合资公司等 Company is willing to actively improve the international operation methods. Such as offices, subsidiaries or joint venture companies	398	1	5	3.62	0.854

		N	Minimum	Maximum	Mean	Std. Deviation
COI-IA	5.2 企业愿意承担和把握国际化过程中的风险和机遇 Company is willing to undertake and grasp the risks and opportunities in the process of internationalization	398	1	5	3.60	0.857
COI-IA	5.3 企业愿意参与国际化分工与合作，如与外商签订分工合同，联合生产等 Enterprises are willing to participate in the international division of labor and cooperation, such as the division of labor contracts with foreign companies, joint production, etc	398	1	5	3.66	0.835
COI-SN	5.4 国内市场经济变革促使企业需要参与国际化经营 The reform of domestic market economy urges enterprises to participate in international operation	398	1	5	3.68	0.845
COI-SN	5.5 国际环境的需求为企业国际化发展提供了市场 The demand of international environment provides a market for the internationalization development of	398	1	5	3.66	0.860

		N	Minimum	Maximum	Mean	Std. Deviation
	enterprises					
COI-SN	5.6 国际合作倡议的国家政策有利于企业海外发展 The national policies of the International Cooperation Initiative are conducive to the overseas development of enterprises	398	1	5	3.68	0.862
COI-SN	5.7 参与国际合作倡议的国家政府为本企业国际经营提供了便利 The governments of countries participating in international cooperation initiatives provide convenience for the international operation of the Company	398	1	5	3.67	0.863
COI-PB	5.8 企业有能力利用国内市场资源 The enterprise has the ability to utilize domestic market resources	398	1	5	3.64	0.833
COI-PB	5.9 企业有能力利用国外市场资源 The enterprise has the ability to utilize foreign market resources	398	1	5	3.62	0.874
COI-PB	5.10 企业能够利用国内政府政策资源 Enterprises can take advantage of domestic government policy	398	1	5	3.65	0.876

		N	Minimum	Maximum	Mean	Std. Deviation
	resources					
COI-PB	5.11 企业能够利用国外政策政府资源 Enterprises can make use of foreign policy and government resources	398	1	5	3.58	0.865
COI-DC	5.12 企业很熟悉和遵循东道国的法律和市场管理规范 The enterprise is familiar and follows the laws and market management norms of the host country	398	1	5	3.64	0.868
COI-DC	5.13 企业能够敏锐洞察到国际市场的变化并把握机会 The enterprise can keenly perceive changes in the international market and grasp opportunities	398	1	5	3.58	0.894
COI-DC	5.14 企业与东道国的政府机构联系紧密，能获得支持 The enterprise has close links with the government agencies of the host country and can get support	398	1	5	3.63	0.835
COI-DC	5.15 企业考虑国外新的供应商和客户 The enterprise considers new foreign suppliers and customers	398	1	5	3.63	0.849

		N	Minimum	Maximum	Mean	Std. Deviation
COI-DC	5.16 企业知道国际经营环境高风险的特点，注重采取谨慎、渐进的方法 The enterprise is aware of the characteristics of high risks in the international business environment and attaches importance to a cautious and gradual approach	398	1	5	3.63	0.846
COI-IB	5.17 企业参与国际市场的进出口活动 The enterprise participates in import and export activities in the international market	398	1	5	3.64	0.852
COI-IB	5.18 企业与国际市场进行人力资源交流活动 The enterprise conduct human resources exchange activities with the international market	398	1	5	3.68	0.869
COI-IB	5.19 企业积极探索国外其他企业的经营合作 The Company actively explore business cooperation with other foreign enterprises	398	1	5	3.68	0.853

		N	Minimum	Maximum	Mean	Std. Deviation
COI-IP	5.20 企业在参加国际合作的过程中提升了生产力 Enterprises improve productivity in the process of participating in international cooperation	398	1	5	3.67	0.818
COI-IP	5.21 企业参与国际合作的过程中获得了较高的财务收益 Enterprises obtain higher financial benefits in the process of participating in international cooperation	398	1	5	3.65	0.888
COI-IP	5.22 企业员工对企业从事的国际化经营活动认可度高 Employees have a high degree of recognition for the international business activities of the enterprise	398	1	5	3.66	0.827
COI-IP	5.23 海外客户对企业从事的国际化经营活动认可度高 Overseas customers have a high degree of recognition for the company's international business activities	398	1	5	3.64	0.830

Source: Author

Reliability and Validity

In this study, Cronbach Alpha (Cronbach, 1951) was used as the reliability test index of the variable. Normally speaking, we follow the standard for Nunally and Bernstein (1978) which is the Cronbach Alpha more than 0.7, but Lance et al. (2006) argued that Nunally intended that the reliability requirements should be consistent with the objectives used for measurement. Hence, if the purpose is only to test the feasibility of the research purpose, Cronbach should reach 0.7; In general basic research and applied research, the reliability requirement should reach 0.8; When the measurement score is used for important decisions, the reliability should be higher than 0.9 (X.-P. Chen et al., 2012). As shown in the left-hand side of Table 23, the Cronbach Alpha value of is 0.992 ＞ 0.9, indicating the internal consistency of the measurement is acceptable. The value of "Cronbach's Alpha if item Deleted (CITC)" of all items are more than 0.692, represented that items should be remained. In conclusion, the reliability coefficient value of the study data is ＞ 0.9, indicating that the data reliability is of high quality and can be used for further analysis.

This study conducted an Exploratory Factor Analysis (EFA) to verify the validity of data through KMO value, variance interpretation rate, factor loading etc. As shown in the right-hand side of Table 23, the KMO value is 0.978, ＞ 0.9 means that the correlation between variables is strong, which is suitable for factor analysis.

As shown in Table 22, totally 68 components were given by Total Variance Explained and sort from the largest value to the smallest value. The initial eigenvalues of components 1, 2, 3, and 4 is larger than 1.2 (Kaiser, 1960), representing that those four components could explain 27.589%, 26.303%, 14.050%, and 10.230%, respectively. The cumulative rotated sum of squared loadings value is 78.172% ＞ 50%, it means that the cumulative percentage of information of research items can be effectively extracted up to 78.172%. Hence, components 1, 2, 3, and 4 can be extracted as main components.

Table 22 Total Variance Explained of Final Study

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	44.454	65.374	65.374	44.454	65.374	65.374	18.760	27.589	27.589
2	4.674	6.874	72.248	4.674	6.874	72.248	17.886	26.303	53.892
3	2.287	3.363	75.610	2.287	3.363	75.610	9.554	14.050	67.942
4	1.742	2.562	78.172	1.742	2.562	78.172	6.956	10.230	78.172
5	1.162	1.708	79.881						
6	0.790	1.162	81.043						
7	0.726	1.067	82.110						
8	0.543	0.799	82.909						
9	0.531	0.782	83.690						
10	0.505	0.742	84.432						
11	0.449	0.661	85.093						
12	0.416	0.611	85.705						
13	0.409	0.602	86.306						
14	0.388	0.571	86.877						
15	0.384	0.564	87.441						
16	0.351	0.516	87.958						
17	0.348	0.511	88.469						
18	0.341	0.501	88.971						
19	0.330	0.485	89.455						
20	0.322	0.473	89.929						
21	0.293	0.430	90.359						
22	0.284	0.417	90.776						
23	0.276	0.406	91.182						
24	0.270	0.397	91.579						
25	0.258	0.380	91.959						
26	0.256	0.377	92.336						
27	0.248	0.365	92.700						
28	0.237	0.349	93.049						
29	0.225	0.330	93.379						
30	0.224	0.329	93.708						
31	0.210	0.309	94.017						
32	0.208	0.305	94.323						
33	0.198	0.291	94.614						
34	0.196	0.288	94.902						
35	0.188	0.276	95.178						
36	0.182	0.267	95.445						
37	0.173	0.254	95.700						

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
38	0.167	0.245	95.945						
39	0.162	0.239	96.184						
40	0.148	0.217	96.401						
41	0.144	0.212	96.613						
42	0.139	0.204	96.817						
43	0.137	0.201	97.018						
44	0.131	0.193	97.211						
45	0.126	0.185	97.396						
46	0.121	0.178	97.574						
47	0.116	0.171	97.745						
48	0.115	0.170	97.915						
49	0.109	0.161	98.076						
50	0.107	0.158	98.233						
51	0.100	0.147	98.380						
52	0.096	0.141	98.521						
53	0.095	0.140	98.661						
54	0.086	0.126	98.788						
55	0.085	0.125	98.913						
56	0.078	0.114	99.027						
57	0.075	0.111	99.138						
58	0.071	0.104	99.242						
59	0.067	0.099	99.341						
60	0.066	0.097	99.438						
61	0.062	0.091	99.529						
62	0.058	0.085	99.614						
63	0.055	0.081	99.695						
64	0.049	0.072	99.767						
65	0.046	0.068	99.834						
66	0.042	0.062	99.896						
67	0.038	0.056	99.952						
68	0.033	0.048	100.000						

Extraction Method: Principal Component Analysis

Table 23 Reliability and Validity Result of Final Study

Reliability, Cronbach's Alpha = 0.992			**Validity, EFA**			
Item-Total Statistics			**KMO = 0.978, Sig = 0.000**			
	Cronbach's Alpha if item Deleted	Corrected Item-Total Correlation (CITC)	Component			
			1	2	3	4
2.1	0.992	0.692		0.685		
2.3	0.992	0.765		0.730		
2.5	0.992	0.752		0.736		
2.6	0.992	0.748		0.728		
2.7	0.992	0.791		0.759		
2.8	0.992	0.765		0.730		
2.9	0.992	0.778		0.728		
2.10	0.992	0.798		0.769		
2.11	0.992	0.799		0.785		
2.15	0.992	0.776		0.748		
2.18	0.992	0.822		0.716		
2.19	0.992	0.825		0.741		
2.20	0.992	0.806		0.710		
2.22	0.992	0.833		0.714		
2.24	0.992	0.839		0.711		
2.25	0.992	0.814		0.729		
2.26	0.992	0.826		0.673		
2.28	0.992	0.830		0.677		
2.30	0.992	0.827		0.703		
2.31	0.992	0.841		0.685		
2.32	0.992	0.828		0.680		
2.33	0.992	0.849		0.684		
2.34	0.992	0.868		0.663		
2.36	0.992	0.858		0.663		
2.38	0.992	0.873		0.617		
3.1	0.992	0.876			0.639	
3.2	0.992	0.781			0.677	

Reliability, Cronbach's Alpha = 0.992			**Validity, EFA**			
Item-Total Statistics			**KMO = 0.978, Sig = 0.000**			
	Cronbach's Alpha if item Deleted	Corrected Item-Total Correlation (CITC)	Component			
			1	2	3	4
3.3	0.992	0.787			0.657	
3.4	0.992	0.776			0.675	
3.5	0.992	0.787			0.635	
3.6	0.992	0.795			0.675	
3.7	0.992	0.828			0.678	
3.8	0.992	0.817			0.623	
3.9	0.992	0.802			0.682	
3.10	0.992	0.807			0.658	
3.11	0.992	0.786			0.660	
4.1	0.992	0.799				0.682
4.2	0.992	0.735				0.686
4.3	0.992	0.728				0.728
4.4	0.992	0.757				0.715
4.5	0.992	0.745				0.720
4.6	0.992	0.747				0.724
4.7	0.992	0.763				0.685
4.8	0.992	0.768				0.712
5.1	0.992	0.750	0.733			
5.2	0.992	0.777	0.708			
5.3	0.992	0.781	0.730			
5.4	0.992	0.796	0.759			
5.5	0.992	0.811	0.756			
5.6	0.992	0.819	0.764			
5.7	0.992	0.808	0.756			
5.8	0.992	0.820	0.774			
5.9	0.992	0.834	0.741			
5.10	0.992	0.800	0.749			
5.11	0.992	0.805	0.738			
5.12	0.992	0.801	0.775			
5.13	0.992	0.810	0.759			

Reliability, Cronbach's Alpha = 0.992			**Validity, EFA**			
Item-Total Statistics			**KMO = 0.978, Sig = 0.000**			
	Cronbach's Alpha if item Deleted	Corrected Item-Total Correlation (CITC)	Component			
			1	2	3	4
5.14	0.992	0.810	0.752			
5.15	0.992	0.813	0.783			
5.16	0.992	0.806	0.789			
5.17	0.992	0.819	0.794			
5.18	0.992	0.821	0.755			
5.19	0.992	0.820	0.770			
5.20	0.992	0.806	0.781			
5.21	0.992	0.836	0.755			
5.22	0.992	0.805	0.765			
5.23	0.992	0.807	0.773			

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

A confirmatory factor analysis (CFA) was conducted as well (Appendix 4). The use of factor analysis to determine the dimension of factors is called exploratory factor analysis (EFA). When researchers make a hypothesis on the possible number or structure of factors based on some theories or other prior knowledge and use factor analysis to test the hypothesis, it is called confirmatory factor analysis (CFA). The CFA attempts to test whether the number of factors and factor loads of the observed variable are consistent with expectations based on the established theory. The observation of construct validity, convergent validity, and discriminant validity are required in CFA.

As shown in table 24, the construct validity of the model was measured by the absolute fitting index and relative fix index. The value of the Chi-square to degree of freedom (X^2/df) is 2.569. The value of Root Mean Square Error of Approximation (RMSEA) is 0.068. The value of Comparative Fit Index (CFI) is 0.902. The value of Incremental Fit Index (IFI) is 0.903, The value of Tucker-Lewis Coefficient (TLI) is 0.894, and Normed Fit Index (NFI) is 0.850, which are all within the tolerance interval. Further means that MSR, SEAP, COI, and SECM have a good model coordination.

Table 24 Construct Validity Goodness-of-fit indexes in CFA

	Absolute fitting index		Relative fit index			
Fitting index	X^2/df	RMSEA	CFI	IFI	TLI	NFI
Standard	＜3	＜1 or ＜0.05	＞0.85	＞0.85	＞0.85	＞0.85
Results	2.569	0.068	0.902	0.903	0.894	0.850
Conclude	PASS	PASS	PASS	PASS	PASS	PASS

As shown in table 25, factor loadings of MSR, SEAP, COI and SECM for each potential variable is greater than 0.7, indicating that each potential variable is highly representative of the corresponding topic. In addition, the Average Variance Extracted (AVE) of each latent variable is greater than 0.5, and the Construct Reliability (CR) is greater than 0.8, indicating that the convergence validity is ideal.

Table 25 Convergent Validity (AVE & CR)

Path			**Estimate**	**AVE**	**CR**
@2.1	<---	MSR1	0.700	0.710	0.984
@2.3	<---	MSR1	0.785		
@2.5	<---	MSR1	0.780		
@2.6	<---	MSR1	0.748		

	Path		Estimate	AVE	CR
@2.7	<---	MSR1	0.803		
@2.8	<---	MSR1	0.773		
@2.9	<---	MSR1	0.794		
@2.10	<---	MSR1	0.828		
@2.11	<---	MSR1	0.826		
@2.15	<---	MSR1	0.810		
@2.18	<---	MSR1	0.861		
@2.19	<---	MSR1	0.866		
@2.20	<---	MSR1	0.842		
@2.22	<---	MSR1	0.872		
@2.24	<---	MSR1	0.888		
@2.25	<---	MSR1	0.872		
@2.26	<---	MSR1	0.866		
@2.28	<---	MSR1	0.876		
@2.30	<---	MSR1	0.878		
@2.31	<---	MSR1	0.895		
@2.32	<---	MSR1	0.881		
@2.33	<---	MSR1	0.900		
@2.34	<---	MSR1	0.899		
@2.36	<---	MSR1	0.897		
@2.38	<---	MSR1	0.886		
@3.1	<---	SEAP1	0.834		
@3.2	<---	SEAP1	0.840		
@3.3	<---	SEAP1	0.828		
@3.4	<---	SEAP1	0.853		
@3.5	<---	SEAP1	0.846		
@3.6	<---	SEAP1	0.910	0.742	0.969
@3.7	<---	SEAP1	0.895		
@3.8	<---	SEAP1	0.853		
@3.9	<---	SEAP1	0.888		
@3.10	<---	SEAP1	0.850		
@3.11	<---	SEAP1	0.875		
@4.1	<---	SECM1	0.873		
@4.2	<---	SECM1	0.857		
@4.3	<---	SECM1	0.923	0.801	0.970
@4.4	<---	SECM1	0.911		
@4.5	<---	SECM1	0.897		

Path			Estimate	AVE	CR
@4.6	<---	SECM1	0.912		
@4.7	<---	SECM1	0.890		
@4.8	<---	SECM1	0.896		
@5.1	<---	COI1	0.835		
@5.2	<---	COI1	0.830		
@5.3	<---	COI1	0.845		
@5.4	<---	COI1	0.883		
@5.5	<---	COI1	0.878		
@5.6	<---	COI1	0.865		
@5.7	<---	COI1	0.869		
@5.8	<---	COI1	0.901		
@5.9	<---	COI1	0.873		
@5.10	<---	COI1	0.875	0.772	0.987
@5.11	<---	COI1	0.869		
@5.12	<---	COI1	0.886		
@5.13	<---	COI1	0.891		
@5.14	<---	COI1	0.871		
@5.15	<---	COI1	0.895		
@5.16	<---	COI1	0.905		
@5.17	<---	COI1	0.901		
@5.18	<---	COI1	0.888		
@5.19	<---	COI1	0.888		
@5.20	<---	COI1	0.909		
@5.21	<---	COI1	0.876		
@5.22	<---	COI1	0.878		
@5.23	<---	COI1	0.895		

As shown in table 26, MSR, SEAP, COI and SECM all have significant correlations ($p < 0.001$). In addition, the absolute value of correlation coefficient is less than the square root of AVE, indicating that each potential variable has a certain correlation and a certain degree of differentiation between them. Further means that the discriminant validity of scale data is ideal.

Table 26 Discriminant Validity

	MSR	SEAP	COI	SECM
MSR	0.710			
SEAP	0.676***	0.742		
COI	0.507***	0.459***	0.801	
SECM	0.508***	0.507***	0.449***	0.772
AVE sqr	0.843	0.861	0.895	0.879

***represents p value less than 0.001.

The diagonal is the extraction of AVE evaluation variance variation.

Correlation Analysis

The study of correlation between variables is mainly carried out from two aspects: one is correlation analysis, that is, introducing certain statistical indicators to quantify the degree of correlation between variables; The second is regression analysis, but regression analysis pays more attention to causation, not just correlation.

The so-called correlation refers to the existing rules between two or more variables in a certain sense, and its purpose is to explore the hidden correlation network in the data set. Galton (1889) proposed the concept of correlation for the first time. He defined correlation as "when one variable changes, another variable changes more or less correspondingly", and the statistic measuring this correlation is called correlation coefficient. The size of the correlation coefficient represents the strength of the correlation. In general, 0 means no correlation, 1 means complete correlation, and the correlation coefficient is between -1 and 1. The larger the absolute index value is, the stronger the correlation is. The smaller the value, the weaker the correlation. In addition, correlation also has direction. When one variable increases, another variable also increases, which is called positive correlation, and the positive number represents

the same direction. When one variable increases and the other decreases, it is called a negative correlation, with a negative number to indicate direction (Hardoon et al., 2004).

Table 27 summarizes the results of the significance and Pearson correlation coefficients. First of all, each variable is correlated with each other and the significant level is < 0.01, representing that there was a significant correlation between the variables. Secondly, the Pearson correlation coefficients r of each variables are > 0, representing there is a significant positive correlation between each other. There is an intensity range of Pearson correlation coefficients: 1.00 = completely correlation, 0.70 to 0.99 = high correlation, 0.40 to 0.69 = moderate collation, 0.10 to 0.39 = low correlation, less than 0.10 = weak or no correlation. For example, the significant level of MSR and SECM is at the 0.01 level and the Pearson r value is 0.697, representing there is a significant positive and high correlation relationship between MSR and SECM. The higher the MSR, the higher the SECM vice versa. Thus, the result was acceptable for further use of analysis such as regression.

By reason of the foregoing, the hypothesis testing for H2 and H3 was conducted. As shown in Table 27, the significant level is at 0.01 represents there is a significant correlation between the independent variable MSR and the mediating variable SEAP. In addition, the Pearson r value is 0.848, representing there is a significant positive and high correlation between MSR and SEAP. The higher the MSR, the higher the SEAP vice versa. Thus, H2 was supported. The correlation between MSR-IS and SEAP is significant and high correlation (r = 0.766, sig. < 0.01); thus, H2a was supported. The correlation between MSR-DS and SEAP is significant and high correlation (r = 0.746, sig. < 0.01); thus, H2b was supported. The correlation between MSR-CS and SEAP is significant and high correlation (r = 0.833, sig. < 0.01); thus, H2c was supported. The correlation between MSR-OS and SEAP is significant and high correlation (r = 0.870, sig. < 0.01); thus, H2d was supported. The correlation between SEAP and SECM is significant and high correlation (r = 0.728,

sig.＜0.01); thus, H3 was supported. There are two possible reasons were summarized. Firstly, in the different life cycle of a project, maintaining long-term social responsibility will produce spillover effects, which may be economic or affect the behaviors of participants. Secondly, continuing to fulfill social responsibilities is an important guarantee for the sustainable development of megaprojects, especially for overseas megaprojects, gaining recognition and support from local people is a soft power performance to improve the competitiveness of overseas megaprojects in the market.

Table 27 Correlation Matrix (H2, H3)

	MSR	SEAP	SECM	COI	MSR-IS	MSR-DS	MSR-CS	MSR-OS
MSR	1							
SEAP	.848**	1						
SECM	.697**	.728**	1					
COI	.775**	.758**	.785**	1				
MSR-IS		.766**	.648**	.705**	1			
MSR-DS		.746**	.652**	.699**		1		
MSR-CS		.833**	.671**	.761**		.	1	
MSR-OS		.870**	.695**	.778**				1

**. Correlation is significant at the 0.01 level (2-tailed). MSR-IS, MSR-DS, MSR-CS, MSR-OS is the different lifecycle stage of MSR.

Regression Analysis

The main differences between correlation analysis and regression analysis are as follows: First, in regression analysis, variable X and variable Y are mainly causality or subordination, while in correlation analysis, variable X and variable Y are equal and mutual. Second, in correlation analysis, all variables are random variables. However, in regression analysis, the dependent variable Y can be a random

variable, and the independent variable X can be a random variable or a non-random deterministic variable (Pearson & Galton, 1895). In the usual regression models, it is generally assumed that the independent variable X is a non-random deterministic variable. Third, the purpose of correlation analysis is to express the closeness and direction of the linear relationship between eight variables with a statistical index (Draper, & Smith, 1998). The purpose of regression analysis is to express quantitatively the relationship between independent variables and dependent variables by function formula. Regression analysis can not only reveal the influence of X on Y, but also predict and control quantitatively by regression equation. Therefore, when the purpose of the study is only to explore the degree and direction of the relationship between two variables, it is best to choose linear correlation analysis. If the goal is to establish a regression equation from independent variables to dependent variables, it is best to choose regression analysis (C. Cruz et al., 2019).

In model 1, the fulfillment of MSR is the independent variable and the religion is control variable. Since religion is a class variable, in order to make the category variables can be used for regression analysis, it is necessary to transform the class variables into dummy variables in a virtual way for virtual regression. Dummy coding was needed to disassemble the original class variable into k-1 dummy variables, and the simultaneous regression analysis technique was applied.

As shown in Table 28, the variance inflation factor (VIFs) was less than 10, indicating that the multicollinearity of regression is within an acceptable range. This model 1 was to test H1, this Model 1 included independent variables (MSR) and control variables (religion). Without the interference of religion. Firstly, the adjusted R square is 0.501, representing that MSR could explain 50.1% of the variation in SECM. The result of the model test indicates that the regression effect is significant and has statistical significance ($F = 43.314$, $sig. < 0.001$). Secondly, MSR had a significant positive effect on SECM ($\beta = 0.615$, $sig. < 0.01$). Thus, H1 was supported. @variables are the dummy variables.

Table 28 Regression Results of MSR to SECM (H1)

	Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
		B	Std. Error	Beta			
	(Constant)	1.367	0.194		7.049	0.000	
IV	MSR	0.615	0.033	0.683	18.719	0.000	1.037
CV	@Buddism	0.008	0.078	0.005	0.107	0.914	1.775
	@Islam	-0.518	0.231	-0.083	-2.240	0.026	1.079
	@Christian	-0.582	0.270	-0.079	-2.157	0.032	1.055
	@no_religion	0.011	0.083	0.006	0.132	0.895	1.737
	@Never_heard_at_all	-0.236	0.193	-0.060	-1.219	0.224	1.890
	@A_little_understanding	-0.070	0.141	-0.043	-0.498	0.619	5.794
	@Have_clear_understanding	-0.039	0.147	-0.021	-0.265	0.791	4.892
	@Know_more_about_this	-0.075	0.158	-0.031	-0.479	0.632	3.192
	R square				0.501		
	F test				43.314		
	P value				＜0.001		

Dependent Variable: SECM

As shown in Table 29, This model 2 was to test H1a, H1b, H1c, and H1d. This Model 1 included four stages of independent variables (MSR-IS, MSR-DS, MSR-CS, and MSR-OS) and control variables (religion).

The variance inflation factors (VIFs) were more than 10, indicating that there was a multicollinearity of regression. However, Multiple collinearity, the more information the overlap between the independent variables Contained in a given sample or any independent variables under the condition of the amount of information is given, an independent variable and other independent variables with overlapping information together, the more effective is the independent variable contains

information is less, and the nature of the multiple collinearity problem is used to estimate parameters of the lack of effective information Insufficient effective information is a sample problem. A sample contains very little effective information because the sample size is too small. At the same time, too small sample size will also cause the phenomenon of false correlation. There is no such thing as a free lunch, and the economic perspective on multicollinearity is perhaps the most illuminating -- it is the price of solving the problem of variable omission bias. Generally speaking, in a large sample, the benefits of solving the problem of variable omission bias will exceed the costs, but if the sample size is small and the effective information is insufficient, the corresponding costs will become unbearable. Unfortunately, empirical analysis strives to maximize sample size. Therefore, it is often unrealistic to increase sample sizes further to solve multicollinearity problems. For this reason, if we don't want to run the risk of missing bias in the variables, we can simply acknowledge the existence of multicollinearity.

Firstly, the adjusted R square is 0.519, representing that MSR-IS, MSR-DS, MSR-CS, and MSR-OS could explain 51.9% of the variation in SECM. Without the interference of religion, the result of model test indicates that the regression effect is significant and has statistical significance ($F = 34.588$, $sig. < 0.001$). Secondly, MSR-DS had a significant positive effect on SECM ($\beta = 0.190$, $sig. < 0.05$). Thus, H1b was supported. MSR-OS had a significant positive effect on SECM ($\beta = 0.430$, $sig. < 0.01$). Thus, H1d was supported. The effect of MSR-IS and MSR-CS on SECM is not significant, therefore H1a and H1c were not supported.

Table 29 Regression Results of MSR (IS, DS, CS, OS) to SECM (H1a, H1b, H1c, and H1d)

	Model 2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
		B	Std. Error	Beta			
	(Constant)	1.357	0.191		7.096	0.000	
IV	MSR-IS	0.070	0.077	0.081	0.912	0.363	6.335
	MSR-DS	0.190	0.083	0.224	2.298	0.022	7.597
	MSR-CS	-0.075	0.110	-0.087	-0.685	0.494	12.820
	MSR-OS	0.430	0.091	0.513	4.704	0.000	9.528
CV	@Buddism	0.001	0.077	0.001	0.012	0.990	1.778
	@Islam	-0.461	0.228	-0.074	-2.020	0.044	1.084
	@Christian	-0.553	0.266	-0.076	-2.077	0.038	1.058
	@no_religion	0.015	0.082	0.009	0.183	0.855	1.740
	@Never_heard_at_all	-0.199	0.192	-0.051	-1.038	0.300	1.914
	@A_little_understanding	-0.070	0.139	-0.043	-0.502	0.616	5.797
	@Have_clear_understanding	-0.059	0.145	-0.032	-0.408	0.683	4.899
	@Know_more_about_this	-0.082	0.156	-0.033	-0.526	0.599	3.197
	R square				0.519		
	F test				34.588		
	P value				＜0.001		

Dependent Variable: SECM

In Table 30, model 3 is to test the H5 with the dependent variable of SECM. The result indicated that COI could explain 62.4% of SECM (Adjusted R square = 0.624). Without the interference of religion, the result of the model test indicates that the regression effect is significant and has statistical significance (F = 71.659, sig.＜ 0.001). COI had a significant positive effect on SECM (β = 0.0.833, sig.＜0.001).

Thus, H5 was supported. In Model 3a, we further deconstructing the dimension of COI and the result of the model 3a test indicates that the regression effect is significant and has statistical significance (F = 48.031, sig.＜0.001). COI-IA and COI-PB had a significant positive effect on SECM, with β = 0.290, sig.＜0.001 and β = 0.368, sig.＜0.001, respectively. Hence, H5a and H5c are supported.

Table 30 Regression Results of COI to SECM

	Model 3	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
		B	Std. Error	Beta			
	(Constant)	0.635	0.180		3.524	0.000	
IV	COI	0.833	0.034	0.776	24.342	0.000	1.049
CV	@Buddism	-0.021	0.068	-0.013	-0.310	0.757	1.777
	@Islam	-0.476	0.201	-0.077	-2.373	0.018	1.079
	@Christian	-0.266	0.235	-0.036	-1.131	0.259	1.062
	@no_religion	-0.032	0.072	-0.018	-0.443	0.658	1.739
	@Never_heard_at_all	-0.010	0.169	-0.003	-0.059	0.953	1.910
	@A_little_understanding	-0.080	0.122	-0.049	-0.653	0.514	5.785
	@Have_clear_understanding	-0.016	0.127	-0.009	-0.127	0.899	4.893
	@Know_more_about_this	-0.025	0.137	-0.010	-0.184	0.854	3.192
	R square				0.624		
	F test				71.659		
	P value				＜0.001		

	Model 3a	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	VIF
		B	Std. Error	Beta			
	(Constant)	0.592	0.179		3.299	0.001	
IV	COI_IA	0.290	0.078	0.282	3.737	0.000	5.990
	COI_SN	-0.049	0.093	-0.048	-0.523	0.602	8.830
	COI_PB	0.368	0.101	0.358	3.634	0.000	10.248
	COI_DC	0.199	0.103	0.193	1.937	0.054	10.526
	COI_IB	-0.027	0.094	-0.026	-0.282	0.778	9.274
	COI_IP	0.059	0.107	0.057	0.552	0.581	11.163
CV	@Buddism	-0.024	0.068	-0.015	-0.355	0.723	1.789
	@Islam	-0.464	0.199	-0.075	-2.334	0.020	1.083
	@Christian	-0.210	0.235	-0.029	-0.892	0.373	1.091
	@no_religion	-0.020	0.071	-0.011	-0.281	0.779	1.751
	@Never_heard_at_all	-0.003	0.167	-0.001	-0.018	0.986	1.918
	@A_little_understanding	-0.046	0.121	-0.028	-0.383	0.702	5.833
	@Have_clear_understanding	0.016	0.127	0.009	0.127	0.899	4.950
	@Know_more_about_this	0.004	0.136	0.002	0.029	0.977	3.215
	R square				0.637		
	F test				48.031		
	P value				＜0.001		

Dependent Variable: SECM

As shown in Table 31, let the SECM be the dependent variable and religion as the control variable, for the model path coefficient of mediating effect of SEAP among MSR (more specifically, IS, DS, CS, and OS) and SECM. First of all, the bias correction non-parametric percentage Bootstrap method with deviation correction was used to test the mediation effect, which was analyzed in Model 4 of the SPSS macro Process (Hayes, 2012). The bias correction non-parametric percentage Bootstrap method was used to test the mediating effect of each intermediary path, and repeated samples were taken 5000 times to calculate the 95% confidence interval (CI). If the CI interval of each path did not contain 0, it indicated that the mediating effect was

significant (Zhonglin et al., 2004). The Bootstrap method, proposed by Efron in 1979, is a statistical inference method of simulated sampling based on mass calculation. It is mainly used for two purposes: 1) to judge whether the estimated value of the original parameter is accurate; 2) to calculate a more accurate confidence interval and judge whether the statistical conclusion is correct.

The MSR has a significant positive effect on SEAP (β =0.8498, p＜0.001), MSR was reintroduced to further validate the mediating role of SEAP, the SEAP has a significant positive effect on SECM (β =0.4408, p＜0.001) and the MSR has a significant positive effect on SECM (β =0.2454, p＜0.001) which are still positive, representing that the SEAP might have the mediating effect between MSR and SECM.

In model 8a, the regression equation of MSR → SEAP is: M=0.3781+0.8498x. This equation is statistically significant (p＜0.001), regression coefficient a=0.8498, significant (p＜0.001), 95% CI (0.7876, 0.9120).

In model 8b, the regression equation of MSR, SEAP → SECM is: Y=1.1098+0.2454x+0.4408M. This equation is statistically significant (p＜0.001), partial regression coefficient b=0.4408, significant (p＜0.001), 95% CI (0.3242, 0.5573); partial regression coefficient c'=0.2454, significant (p＜0.001), 95% CI (0.1256, 0.3653). According to Zhonglin et al. (2004), if c' is not significant, it is fully mediated vice versa. Therefore, SEAP plays a partial mediated role here.

In model 8c, the total effect: c=0.6200, significant (p＜0.001); direct effect: c'=0.2454, significant (p＜0.001); indirect effect=a*b=c-c'=0.3746. The proportion of mediating effect=indirect effect/total effect (%) =0.3746/0.6200=60.42%. Representing that the indirect effect of SEAP to SECM is 0.3746, contributing 60.42%, the Bootstrap 95% CI (0.2441, 0.5061) without zero. Hence, this result is statistically significant and H4 was supported.

In model 4a, the regression equation of IS → SEAP is: M=0.8530+0.7314x. This equation is statistically significant (p＜0.001), regression coefficient a=0.8530, significant (p＜0.001), 95% CI (0.6609, 0.8019).

In model 4b, the regression equation of IS, SEAP → SECM is: Y=1.1300+0.1952x+0.4902M. This equation is statistically significant (p＜0.001), partial regression coefficient b=0.4902, significant (p＜0.001), 95% CI (0.3919, 0.5885); partial regression coefficient c'=0.1952, significant (p＜0.001), 95% CI (0.0986, 0.2919). Therefore, SEAP plays partial mediated role here.

In model 4c, the total effect: c=0.5538, significant (p＜0.001); direct effect: c'=0.1952, significant (p＜0.001); indirect effect=a*b=c-c'=0.3585. The proportion of mediating effect=indirect effect/total effect (%) =0.3585/0.5538=64.73%. Representing that the indirect effect of SEAP to SECM is 0.3585, contributing 64.73%, the Bootstrap 95% CI (0.2567, 0.4743) without zero. Hence, this result is statistically significant and H4a was supported.

In model 5a, the regression equation of DS → SEAP is: M=1.0373+0.6897x. This equation is statistically significant (p＜0.001), regression coefficient a=1.0373, significant (p＜0.001), 95% CI (0.6180, 0.7613).

In model 5b, the regression equation of DS, SEAP → SECM is: Y=1.1153+0.2125x+0.4789M. This equation is statistically significant (p＜0.001), partial regression coefficient b=0.4789, significant (p＜0.001), 95% CI (0.3852, 0.5726); partial regression coefficient c'=0.2125, significant (p＜0.001), 95% CI (0.1226, 0.3025). Therefore, SEAP plays partial mediated role here.

In model 5c, the total effect: c=0.5428, significant (p＜0.001); direct effect: c'=0.2125, significant (p＜0.001); indirect effect=a*b=c-c'=0.3303. The proportion of mediating effect=indirect effect/total effect (%) =0.3303/0.5428=60.85%. Representing that the indirect effect of SEAP to SECM is 0.3303, contributing 60.85%, the Bootstrap 95% CI (0.2325, 0.4326) without zero. Hence, this result is statistically significant and H4b was supported.

In model 6a, the regression equation of CS → SEAP is: M=0.5453+0.7886x. This equation is statistically significant ($p < 0.001$), regression coefficient a=0.5453, significant ($p < 0.001$), 95% CI (0.7252, 0.8519).

In model 6b, the regression equation of CS, SEAP → SECM is: Y=1.1747+0.1635x+0.5052M. This equation is statistically significant ($p < 0.001$), partial regression coefficient b=0.5052, significant ($p < 0.001$), 95% CI (0.3945, 0.6159); partial regression coefficient c'=0.1635, significant ($p < 0.001$), 95% CI (0.0544, 0.2725). Therefore, SEAP plays partial mediated role here.

In model 6c, the total effect: c=0.5618, significant ($p < 0.001$); direct effect: c'=0.1635, significant ($p < 0.001$); indirect effect=a*b=c-c'=0.3984. The proportion of mediating effect=indirect effect/total effect (%) =0.3984/0.5618=70.91%. Representing that the indirect effect of SEAP to SECM is 0.3984, contributing 70.91%, the Bootstrap 95% CI (0.3021, 0.5116) without zero. Hence, this result is statistically significant and H4c was supported.

In model 7a, the regression equation of OS → SEAP is: M=0.4046+0.7999x. This equation is statistically significant ($p < 0.001$), regression coefficient a=0.4046, significant ($p < 0.05$), 95% CI (0.7451, 0.8547).

In model 7b, the regression equation of OS, SEAP → SECM is: Y=1.1990+0.1635x+0.4928M. This equation is statistically significant ($p < 0.001$), partial regression coefficient b=0.4928, significant ($p < 0.001$), 95% CI (0.3692, 0.6163); partial regression coefficient c'=0.1635, significant ($p < 0.001$), 95% CI (0.0462, 0.2808). Therefore, SEAP plays partial mediated role here.

In model 7c, the total effect: c=0.5577, significant ($p < 0.001$); direct effect: c'=0.1635, significant ($p < 0.001$); indirect effect=a*b=c-c'=0.3942. The proportion of mediating effect=indirect effect/total effect (%) =0.3942/0.5577=70.68%. Representing that the indirect effect of SEAP to SECM is 0.3942, contributing 70.68%, the Bootstrap 95% CI (0.2734, 0.5332) without zero. Hence, this result is statistically significant and H4d was supported.

Standardized path coefficient models for each model as shown in Figure 15.

Table 31 Model Testing of Mediation and the Mediating Effect of SEAP (H4)

Model 4		Model 4a			Model 4b				Model 4c		
		SEAP			SECM				Total Effect	Direct Effect	Indirect Effect
		constant a	IS	control	constant a	SEAP	IS	control			
b coeff		0.8530	0.7314	0.0461	1.1300	0.4902	0.1953	-0.0150			
SE		0.1932	0.0358	0.0343	0.1821	0.0500	0.0491	0.0315			
T		4.4139***	20.4091***	0.1800	6.2055***	9.8085***	3.9733***	-0.4767	14.8891***	3.9733***	-
95%	LLCI	0.4728	0.6609	-0.0214	0.7718	0.3919	0.0986	-0.0770	0.4806	0.0986	0.2567
	ULCI	1.2331	0.8019	0.1135	1.4883	0.5885	0.2919	0.0469	0.6269	0.2919	0.4743
effect									0.5538	0.1952	0.3585
Boot SE									0.0372	0.0491	0.0559
R^2		0.5544			0.5319						
F		209.0003***			126.9086***						

*p＜0.05, **p＜0.01, ***p＜0.001

Model 5		Model 5a			Model 5b				Model 5c		
		SEAP			SECM				Total Effect	Direct Effect	Indirect Effect
		constant a	DS	control	constant a	SEAP	DS	control			
b coeff		1.0373	0.6897	0.0287	1.1153	0.4789	0.2125	-0.0197			
SE		0.1979	0.0364	0.0357	0.1796	0.0476	0.0457	0.0312			
T		5.2419***	18.9328***	0.8047	6.2085***	10.0573***	4.6494***	-0.6317	14.9844***	4.6494***	-
95%	LLCI	0.6480	0.6180	-0.0415	0.7620	0.3852	0.1226	-0.0810	0.4716	0.1226	0.2325
	ULCI	1.4265	0.7613	0.0989	1.4687	0.5726	0.3025	0.0416	0.6141	0.3025	0.4326
effect									0.5428	0.2125	0.3303
Boot SE									0.0362	0.0457	0.0509
R^2		0.5171			0.5396						
F		179.9032***			130.8737***						

*p＜0.05, **p＜0.01, ***p＜0.001

Model 6		Model 6a			Model 6b				Model 6c		
		SEAP			SECM				Total Effect	Direct Effect	Indirect Effect
		constant a	CS	control	constant a	SEAP	CS	control			
b coeff		0.5453	0.7886	0.0324	1.1747	0.5052	0.1635	-0.0187			
SE		0.1763	0.0322	0.0308	0.1844	0.0563	0.0554	0.0318			
T		3.9034**	24.4698***	1.0549	6.3694***	8.9769***	2.9482**	-0.5891	15.1969***	2.9482**	-
95%	LLCI	0.1986	0.7252	-0.0281	0.8119	0.3945	0.0544	-0.0812	0.4891	0.0544	0.3021
	ULCI	0.8921	0.8519	0.0930	1.5374	0.6159	0.2725	0.0438	0.6346	0.2725	0.5116
effect									0.5618	0.1635	0.3984
Boot SE									0.0370	0.0554	0.0528
R^2		0.6413			0.5223						

F	300.2989***	122.0830***

*p＜0.05, **p＜0.01, ***p＜0.001

Model 7		Model 7a			Model 7b				Model 7c		
		SEAP			SECM				Total Effect	Direct Effect	Indirect Effect
		constant a	OS	control	constant a	SEAP	OS	control			
b coeff		0.4046	0.7999	0.0529	1.1990	0.4928	0.1635	-0.0140			
SE		0.1577	0.0279	0.0276	0.1834	0.0628	0.0596	0.0320			
T		2.5651*	28.7172***	1.9165	6.5387***	7.8445***	2.7426**	-0.4380	16.0049***	2.7426**	-
95%	LLCI	0.0943	0.7451	-0.0014	0.8383	0.3692	0.0462	-0.0769	0.4891	0.0462	0.2734
	ULCI	0.7148	0.8547	0.1072	1.5597	0.6163	0.2808	0.0489	0.6262	0.2808	0.5332
effect									0.5577	0.1635	0.3942
Boot SE									0.0348	0.0596	0.0657
R^2		0.7111			0.5206						
F		413.4709***			121.2870***						

*p＜0.05, **p＜0.01, ***p＜0.001

Model 8		Model 8a			Model 8b				Model 8c		
		SEAP			SECM				Total Effect	Direct Effect	Indirect Effect
		constant	MSR	control	constant	SEAP	MSR	control			
b coeff		0.3781	0.8498	0.0319	1.1098	0.4408	0.2454	-0.0169			
SE		0.1674	0.0316	0.0289	0.1832	0.0593	0.6090	0.0314			
T		2.2587*	26.8926***	1.1046	6.0569***	7.4379***	4.0274***	-0.5387	16.7589***	4.0274***	-
95%	LLCI	0.0488	0.7876	-0.0249	0.7494	0.3242	0.1256	-0.0788	0.5472	0.1256	0.2441
	ULCI	0.7075	0.9120	0.0888	1.4703	0.5573	0.3653	0.0449	0.6928	0.3653	0.5061
effect									0.6200	0.2454	0.3746
Boot SE									0.0370	0.0609	0.0662
R^2		0.6834			0.5325						
F		362.6414***			127.2029***						

*p＜0.05, **p＜0.01, ***p＜0.001

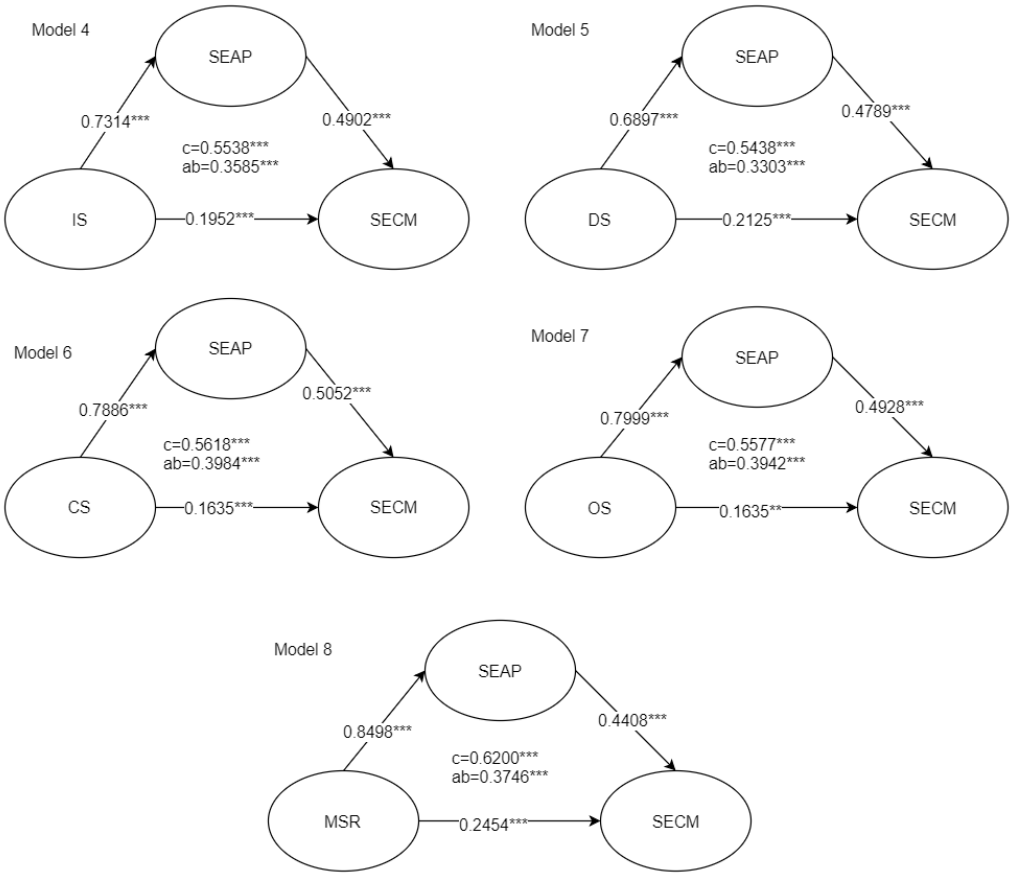


Figure 14 Standardized Path Coefficient Models for MSR, IS, DS, CS, and OS

Table 32 presents the regression results with the MSR and the four dimensions (IS, DS, CS, OS) of MSR as independent variable.

Model 9, 10, and 11 were used to test H6, with SECM as dependent variable. Model 11 indicated that the moderating effect of COI was not significant (β =0.0222, p > 0.05), H6 was not supported. Model 9a, 10a, and 11a were used to test H6a, with SECM as dependent variable. Model 11a indicated that the moderating effect of COI was not significant (β =0.0111, p > 0.05), H6a was not supported. Model 9b, 10b, and 11b were used to test H6b, with SECM as dependent variable. Model 11b indicated that the moderating effect of COI was not significant (β =0.0124, p > 0.05), H6b was not supported. Model 9c, 10c, and 11c were used to test H6c, with SECM as dependent

variable. Model 11c indicated that the moderating effect of COI was not significant (β =0.0179, p＞0.05), H6d was not supported. Model 9d, 10d, and 11d were used to test H6d, with SECM as dependent variable. Model 11d indicated that the moderating effect of COI was not significant (β =0.0170, p＞0.05), H6b was not supported.

Table 32 Testing of Moderating Effect

`	Model 9		Model 10		Model 11	
	SECM		SECM		SECM	
	Beta	t	Beta	t	Beta	t
MSR			0.2161	4.1137	0.2243	4.1355
COI			0.6046	11.4948	0.6025	11.4186
MSR×COI					0.0222	0.6168
1.2 您是否有宗教信仰？	0.0050	0.0909	0.0350	1.0201	0.0328	0.9498
What's your religion?						
R^2	0.0000		0.6094		0.6098	
F	0.0083		174.2075***		130.5090	
	Model 9a		Model 10a		Model 11a	
	SECM		SECM		SECM	
	Beta	t	Beta	t	Beta	t
IS			0.1942	4.1280	0.1968	4.1139
COI			0.6352	13.4859	0.6355	13.4711
IS×COI					0.0111	0.3139
1.2 您是否有宗教信仰？	0.0050	0.0909	0.0406	1.1861	0.0396	1.1517
What's your religion						
R^2	0.0000		0.6095		0.6096	
F	0.0083		174.3029		130.4000	
	Model 9b		Model 10b		Model 11b	
	SECM		SECM		SECM	
	Beta	t	Beta	t	Beta	t
DS			0.2100	4.5587	0.2128	4.5474
COI			0.6269	13.5908	0.6274	13.5775
DS×COI					0.0124	0.3507
1.2 您是否有宗教信仰？	0.0050	0.0909	0.0349	1.0232	0.0338	0.9843
What's your religion						
R^2	0.0000		0.6136		0.6138	
F	0.0083		177.3421		132.6891	

	Model 9c SECM		Model 10c SECM		Model 11c SECM	
	Beta	t	Beta	t	Beta	t
CS			3.2537	0.0013	0.1714	3.2610
COI			0.6485	12.8104	0.6467	12.7282
CS×COI					0.0179	0.4880
1.2 您是否有宗教信仰？ What's your religion	0.0909	0.9276	1.0999	0.2722	0.0363	1.0416
R^2	0.0000		0.6022		0.6025	
F	0.0083		169.0603		126.5664	
	Model 9d SECM		Model 10d SECM		Model 11d SECM	
	Beta	t	Beta	t	Beta	t
OS			0.1773	3.3559	0.1838	3.3597
COI			0.6343	11.9913	0.6325	11.9101
OS×COI					0.0170	0.4672
1.2 您是否有宗教信仰？ What's your religion	0.0050	0.0909	0.0418	1.2123	0.0403	1.1615
R^2	0.0000		0.6030		0.6033	
F	0.0083		169.6089		126.9644	

***p＜0.001

a. Dependent Variable: SECM

b. Predictors: (Constant), 1.2 您是否有宗教信仰？ What's your religion"

c. Predictors: (Constant), 1.2 您是否有宗教信仰？ What's your religion, OS, COI"

d. Predictors: (Constant), 1.2 您是否有宗教信仰？ What's your religion, OS, COI, int_1"

Conclusion

This chapter demonstrates the final data analysis and test the research hypothesis. All the research hypothesis test results are shown in Table 33, and the research test results are charted in Appendix 5.

Section 4.2 presents the descriptive analysis of the final results including demographic information and the mean value analysis of SECM, SEAP, COI, and each dimension of the MSR. Section 4.3 illustrates the reliability of the questionnaire

and the Cronbach Alpha value of is 0.991 ＞ 0.9, indicating the internal consistency of the measurement is acceptable and the reliability coefficient value of the study data is ＞ 0.9, indicating that the data reliability is of high quality and can be used for further analysis. An Exploratory Factor Analysis (EFA) method is applied to verify the validity of data through KMO value, the KMO value is 0.974, ＞ 0.9 means that the correlation between variables is strong, which is suitable for factor analysis. Furthermore, a confirmatory factor analysis (CFA) was conducted. the value of X^2/df is 2.569, RMSEA is 0.068, CFI is 0.902, IFI is 0.903, TLI is 0.894, and NFI is 0.850, which are all within the tolerance interval. The factor loading, AVE, and CR are all within acceptance level, the absolute value of correlation coefficient is less than the square root of AVE, representing that the discriminant validity of scale data is ideal.

The results of this questionnaire show that stakeholders' satisfaction with the social responsibility of megaprojects, participation in environmental activities and satisfaction of environmental compensation is not very ideal, with a score between 3 and 4, which is still far from 4. Therefore, how to improve and solve the above problems is urgent need, which further illustrates the importance of this research.

Firstly, in section 4.4 and 4.5 are represented the processes of testing hypothesis and the test results of research hypothesis. In section 4.4, there are six hypothesized path relationships are tested as positive relations through correlation analysis (H2, H2a, H2b, H2c, H2d, and H3), represents that the higher the performance of social responsibility in megaprojects, the higher the participating of environmental activities, vice versa.

Secondly, in section 4.5, to test the influencing effect of MSR on SECM and COI on SECM, multiple linear regression analysis was conducted. There are four hypothesized path relationships are tested as significant influence (H1, H1b, H1d, and H5) whereas two are tested as non-significant influence path relationships (H1a and H1c), represents that the higher the design stage, operation stage, and cognition of internationalization, the higher the satisfaction on environmental compensation

mechanism. Which further means that if we want to improve people's satisfaction with environmental compensation mechanism, we must start from improving the social responsibility and international cognition of megaprojects in the design and operation stage. In addition, the social responsibilities in the initiation and construction stages do not affect the satisfaction with environmental compensation. Therefore, due to the limited time and funds, the social responsibilities in the initiation and construction stages can be appropriately placed in the secondary position. Interestingly, we found that the SECM of Islamic people was significantly lower than that of non-religious people ($\beta = -1.476$, sig. < 0.001).

Thirdly, mediation test (SEAP) is conducted to test the mediating effect between MSR and SECM. All the significance of a, b, and c' are significant and all the Bootstrap 95%CI excluding zero, therefore, the SEAP plays a partial mediating effect between MSR and SECM, and five hypothesized path relationships are supported (H4, H4a, H4b, H4c, and H4d) which means that in the four stages of megaproject, the degree of participation in environmental protection activities will affect the megaproject's fulfillment of social responsibility. The more times of participation, the higher the degree of satisfaction with environmental compensation mechanism, and vice versa.

Last but not the least, the moderating effect is tested after the decentralization process of MSR, IS, DS, CS, OS, and COI, following by observing the coefficient Beta and significance of the interaction term. The hypothesized path relations of moderating effect are not supported (H6, H6a, H6b, H6c, and H6d) which means that the variation of people's cognition of internationalization does not change the degree of influence of megaproject social responsibility on environmental compensation mechanism satisfaction.

Table 33 Research Hypothesis Test Results

Research Hypothesis	Test Result
H1: MSR has a significant influence on SECM.	Supported
H1a: Initiating stage of MSR has a significant influence on SECM.	Not Supported
H1b: Design stage of MSR has a significant influence on SECM.	Supported
H1c: Construction stage of MSR has a significant influence on SECM.	Not Supported
H1d: Operation stage of MSR has a significant influence on SECM.	Supported
H2: There is a positive relationship between MSR and SEAP.	Supported
H2a: There is a positive relationship between the initiating stage of MSR and SEAP.	Supported
H2b: There is a positive relationship between the design stage of MSR and SEAP.	Supported
H2c: There is a positive relationship between the construction stage of MSR and SEAP.	Supported
H2d: There is a positive relationship between the operation stage of MSR and SEAP.	Supported
H3: There is a positive relationship between SEAP and SECM.	Supported
H4: SEAP mediates the effect of MSR and SECM.	Supported
H4a: SEAP mediates the effect of the initiating stage of MSR and SECM.	Supported
H4b: SEAP mediates the effect of the design stage of MSR and SECM.	Supported
H4c: SEAP mediates the effect of the construction stage of MSR and SECM.	Supported
H4d: SEAP mediates the effect of the operation stage of MSR and SECM.	Supported
H5: COI has a significant influence on SECM.	Supported
H5a: International Attitude aspect of COI has a significant influence on SECM.	Supported
H5b: Subjective Norm aspect of COI has a significant influence on SECM.	Not Supported
H5c: Perceived Behavioral Control aspect of COI has a significant influence on SECM.	Supported
H5d: Dual Cognitive aspect of COI has a significant influence on SECM.	Not Supported
H5e: Internationalization Behavior aspect of COI has a significant influence on SECM.	Not Supported
H5f: Internationalization Performance aspect of COI has a significant influence on SECM.	Not Supported
H6: COI moderate the effect of relationship between MSR and SECM.	Not Supported
H6a: COI moderate the effect of relationship between the initiating stage of MSR and SECM.	Not Supported
H6b: COI moderate the effect of relationship between the design stage of MSR and SECM.	Not Supported
H6c: COI moderate the effect of relationship between the construction stage of MSR and SECM.	Not Supported
H6d: COI moderate the effect of relationship between the operation stage of MSR and SECM.	Not Supported

Source: Author

CHAPTER V

CONCLUSION

Conclusion

From the perspectives of stakeholder theory, life cycle theory and satisfaction theory, this study empirically studies the factors that affect the satisfaction of environmental compensation mechanism, and the research results expand the discussion and improve the understanding of the relationships between megaproject social responsibility (MSR), stakeholder environmental activities participation (SEAP), cognition of internationalization (COI), and satisfaction of environmental compensation mechanism (SECM) in the context of Thailand. Finally, suggestions on policies and activities to improve the SECM and future prospects are given. The findings of the study can be understood as following.

In order to improve the Satisfaction of Environmental Compensation Mechanism:

1. From the perspective of Megaproject Social Responsibility:

The stakeholders who fulfill megaproject social responsibility are divided into the primary and secondary. The primary stakeholders are the central government, the local government, Chinese contractor or sub-contractor, media, community or public. Secondary stakeholders are designer, owner, supplier, project supervision, operator.

1.1 Design Stage -- Satisfaction of Environmental Compensation Mechanism

In the megaproject design stage, the social responsibility is mainly concentrated on the designers and the government. If the designers and the government perform more social responsibility, the stakeholders will have higher satisfaction with the environmental compensation mechanism. Those social responsibilities for designers and the government are following:

1.1.1 In the megaproject design stage, the designer, as a secondary stakeholder, selecting the best design concept while ensuring the design quality, considering the projects' innovation and technological progress, actively using the

concept of sustainable design and green design, and adopting the concept of community-centered design.

1.1.2 In the megaproject design stage, the government, as a primary stakeholder, disclosing the project design scheme to public, listening to the public's suggestions on the design scheme, and supervising the design cost of project.

1.2 Operation Stage -- Satisfaction of Environmental Compensation Mechanism

In the megaproject operation stage, the social responsibility is mainly concentrated on the operator. If the operators perform more social responsibility, the stakeholders will have higher satisfaction with the environmental compensation mechanism. Those social responsibilities for operators are following:

The operator, as a secondary stakeholder, carrying out the routine maintenance on the project, controlling the operation cost and quality of the project, complying with laws, industry norms and contract provisions, reasonable use of resources, protecting the community and regional ecological environment, and actively maintaining the relationship with the community.

2. From the perspective of Stakeholder Environmental Activities Participation:

2.1 Stakeholder Environmental Activities Participation -- Satisfaction of Environmental Compensation Mechanism

In terms of environmental activities, the more times stakeholders participate in environmental activities, the higher the satisfaction of environmental compensation mechanism.

2.1.1 The stakeholder environmental activities participation from contractor or sub-contractor aspect, including concerning about the use of environmentally friendly building materials by contractors or sub-contractors, concerning the contractor or sub-contractor to place the garbage dump in the designated location periodically, concerning about whether the contractor or sub-contractor has cleaned the transport vehicles before driving on the road will increase the satisfaction of environmental compensation mechanism considerably.

2.1.2 The satisfaction of environmental compensation mechanism will increase considerably by the stakeholder environmental activities participation from project staff aspect, those activities including the concern about whether people involved in the project regularly participate in environmental protection education and giving stakeholder's opinion to the people involved in the project about what they are doing to protect the environment.

2.1.3 The satisfaction of environmental compensation mechanism can be improved significantly from the participating perspective of the government and media aspect by: concerning about whether the government has placed garbage bin in various areas, concerning about whether the government has formulated and implemented environmental protection policies and measures, and make sure that stakeholder can learn environmental protection knowledge, concerning about whether the government and media actively publicize the importance of environmental protection, and let stakeholders put forward their own suggestions for environmental protection to the project, and concerning about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures.

1) The stakeholder environmental activities participation from the project legal aspect, can improve the satisfaction of environmental compensation mechanism substantially by: concerning whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy etc.

2) The stakeholder environmental activities participation from the public aspect will considerably improve the satisfaction of environmental compensation mechanism. Those activities including concerning about people consciously classify garbage and do not litter.

2.1.4 Design stage -- Stakeholder Environmental Activities Participation -- Satisfaction of Environmental Compensation Mechanism:

The great majority of people consider that during the project design stage, the designer, as a secondary stakeholder, selecting the best design concept while ensuring the design quality, considering the projects' innovation and technological progress, actively using the concept of sustainable design and green design, and adopting the concept of community-centered design, together with the

government, as a primary stakeholder, not only disclosing the project design scheme to public, listening to the public's suggestions on the design scheme, but also supervising the design cost of project in the project design stage, will affect the stakeholder participation times in environmental activities. The more times of the stakeholder participation in environmental activities, the higher the satisfaction of environmental compensation mechanism from stakeholder. Table 34 summarized the megaproject social responsibilities during the project design stage.

Table 34 Megaproject Social Responsibilities During the Project Design Stage

Project design stage	Designer (Secondary Stakeholder)	The economical optimal design by ensuring project quality
		The project innovation and technological progress
		Sustainable design concept
		Community-centered design
	Government (Primary Stakeholder)	Publishing the project design scheme
		Listening the suggestions from publics
		Supervision for project design cost

Those activities participated are divided by stakeholder types below:

1) Contractor or sub-contractor aspect: concerning about the use of environmentally friendly building materials by contractors or sub-contractors, concerning the contractor or sub-contractor to place the garbage dump in the designated location periodically, concerning about whether the contractor or sub-contractor has cleaned the transport vehicles before driving on the road.

2) Project staff aspect: those activities including the concern about whether people involved in the project regularly participate in environmental protection education and giving stakeholder's opinion to the people involved in the project about what they are doing to protect the environment.

3) The government and media aspect: concerning about whether the government has placed garbage bin in various areas, concerning about whether the government has formulated and implemented environmental protection policies and measures, and make sure that stakeholder can learn environmental

protection knowledge, concerning about whether the government and media actively publicize the importance of environmental protection, and let stakeholders put forward their own suggestions for environmental protection to the project, and concerning about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures.

4) The project legal aspect: concerning whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy etc.

5) The public aspect: concerning about people consciously classify garbage and do not litter.

3. Operation Stage -- Stakeholder Environmental Activities Participation -- Satisfaction of Environmental Compensation Mechanism:

The great majority of people consider that during the project operation stage, the operator, as a secondary stakeholder, carrying out the routine maintenance on the project, controlling the operation cost and quality of the project, complying with laws, industry norms and contract provisions simultaneously, reasonable use of resources, protecting the community and regional ecological environment, and actively maintaining the relationship with the community at the same time, will affect stakeholder participation in environmental activities. The more times of the stakeholder participation in environmental activities, the higher the satisfaction of environmental compensation mechanism from stakeholder. Table 35 summarized the megaproject social responsibilities during the project operation stage.

Table 35 Megaproject Social Responsibilities During the Project Operation Stage

Project operating stage	Operator (Secondary Stakeholder)	Carries out routine maintenance
		Control the operation cost and quality
		Comply with laws
		Reasonable use of resources
		Protect the community and regional environment
		Actively maintain the relationship with community

Those activities participated are divided by stakeholder types below:

3.1 Contractor or sub-contractor aspect: concerning about the use of environmentally friendly building materials by contractors or sub-contractors, concerning the contractor or sub-contractor to place the garbage dump in the designated location periodically, concerning about whether the contractor or sub-contractor has cleaned the transport vehicles before driving on the road.

4. Project staff aspect: those activities including the concern about whether people involved in the project regularly participate in environmental protection education and giving stakeholder's opinion to the people involved in the project about what they are doing to protect the environment.

5. The government and media aspect: concerning about whether the government has placed garbage bin in various areas, concerning about whether the government has formulated and implemented environmental protection policies and measures, and make sure that stakeholder can learn environmental protection knowledge, concerning about whether the government and media actively publicize the importance of environmental protection, and let stakeholders put forward their own suggestions for environmental protection to the project, and concerning about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures.

6. The project legal aspect: concerning whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy etc.

7. The public aspect: concerning about people consciously classify garbage and do not litter.

8. Initiation Stage -- Stakeholder Environmental Activities Participation -- Satisfaction of Environmental Compensation Mechanism

The great majority of people consider that fulfillment of megaproject social responsibility during the project initiation stage does not directly affects the environmental compensation mechanism satisfaction. However, under the influence of stakeholder environmental activities participation, the higher participation in environmental activities, the higher the satisfaction of environmental compensation mechanism from stakeholder.

Those megaproject social responsibilities during the project initiation stage including:

Table 36 summarized the megaproject social responsibilities during the project initiation stage. The government, as a primary stakeholder, carrying out the routine maintenance on the project, providing a forecast report on the economic benefits that the project would bring to the local area, considering the financial impact of the project on everyone involved, analyzing the feasibility of the technical difficulties of the project, actively organizing public participation, such as public hearings, considering the environmental and ecological impact of the project, and has the environmental assessment report (EIA), considering the situation that the project respects religion, nationality and culture (such as alms giving). The media, as a primary stakeholder as well, fairly reporting the legitimacy of the publicity activities related to the project, always paying attention to the ethical and environmental issues related to the project and paying attention to the needs of the community and the publics.

Table 36 Megaproject Social Responsibilities During the Project Initiation Stage

Project initiating stage	Government (primary stakeholder)	Economic benefits forecasting report
		Financial impart for each participant
		Technology feasibility
		Organizing public participation
		EIA
		Culture consideration
	Media (primary stakeholder)	Reporting the legitimacy of publicity activities
		Pay attention to the ethical and environmental issues
		Pay attention to the community's need

Those activities participated are divided by stakeholder types below:

a) Contractor or sub-contractor aspect: concerning about the use of environmentally friendly building materials by contractors or sub-contractors, concerning the contractor or sub-contractor to place the garbage dump in the designated location periodically, concerning about whether the contractor or sub-contractor has cleaned the transport vehicles before driving on the road.

b) Project staff aspect: those activities including the concern about whether people involved in the project regularly participate in environmental protection education and giving stakeholder's opinion to the people involved in the project about what they are doing to protect the environment.

c) The government and media aspect: concerning about whether the government has placed garbage bin in various areas, concerning about whether the government has formulated and implemented environmental protection policies and measures, and make sure that stakeholder can learn environmental protection knowledge, concerning about whether the government and media actively publicize the importance of environmental protection, and let stakeholders put forward their own suggestions for environmental protection to the project, and concerning about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures.

d) The project legal aspect: concerning whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy etc.

e) The public aspect: concerning about people consciously classify garbage and do not litter.

9. Construction Stage -- Stakeholder Environmental Activities Participation -- Satisfaction of Environmental Compensation Mechanism

The great majority of people consider that fulfillment of megaproject social responsibility during the project construction stage does not directly affects the environmental compensation mechanism satisfaction. However, under the influence of stakeholder environmental activities participation, the higher participation in environmental activities, the higher the satisfaction of environmental compensation mechanism from stakeholder.

Those megaproject social responsibilities during the project construction stage including:

Table 37 summarized the megaproject social responsibilities during the project construction stage. The project legal person, as a primary stakeholder, monitoring the project quality and safety construction, ensuring the security of funds and reasonable returns, adopting the concept of green construction, paying active attention to the needs of the surrounding communities and the public. The contractor,

as a primary stakeholder as well, strictly controlling the cost and duration of the project, innovating and improves the construction technology, carrying out reasonable recycling and utilization of resources, complying with laws, regulations and industry norms, ensuring the quality of the works and construction safety, taking measures to protect the ecological environment of the surrounding communities and areas, actively maintaining the community relations around the site, and actively dealing with emergency public events during construction. The project supervisor, as a secondary stakeholder, supervising the project quality and safety, supervising the rights and interests of the project construction staff, and supervising the environmental protection measures of the project. The supplier, as a secondary stakeholder, guarantee the quality of construction materials and actively promoting and uses green materials.

Table 37 Megaproject Social Responsibilities During the Project Construction Stage

Project construction stage	Project legal (Primary Stakeholder)	Monitor the project quality and safety construction
		Ensures the security of funds and reasonable returns
		Adopts the concept of green construction
		Pay attention to the communities needs
	Contractor (Primary Stakeholder)	Project cost and schedule control
		Improves the construction technology
		Reasonable recycling the resources
		Comply with laws, regulations, and industry norms
		Ensures the project quality and safety
		Take measures to project the ecological environment of surrounding communities
		Actively maintains the community relations around site
		Deal with the emergency public events
	Supervisor (Secondary Stakeholder)	Supervise the project quality and safety
		Supervise the rights and interests of project staffs
		Supervise the environmental protection measures
	Supplier (Secondary Stakeholder)	Guarantee the quality of construction materials
		Actively promotes green materials

Those activities participated are divided by stakeholder types below:

a) Contractor or sub-contractor aspect: concerning about the use of environmentally friendly building materials by contractors or sub-contractors, concerning the contractor or sub-contractor to place the garbage dump in the designated location periodically, concerning about whether the contractor or sub-contractor has cleaned the transport vehicles before driving on the road.

b) Project staff aspect: those activities including the concern about whether people involved in the project regularly participate in environmental protection education and giving stakeholder's opinion to the people involved in the project about what they are doing to protect the environment.

c) The government and media aspect: concerning about whether the government has placed garbage bin in various areas, concerning about whether the government has formulated and implemented environmental protection policies and measures, and make sure that stakeholder can learn environmental protection knowledge, concerning about whether the government and media actively publicize the importance of environmental protection, and let stakeholders put forward their own suggestions for environmental protection to the project, and concerning about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures.

d) The project legal aspect: concerning whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy etc.

e) The public aspect: concerning about people consciously classify garbage and do not litter.

3. From the perspective of Cognition of Internationalization:

Cognition of Internationalization -- Satisfaction of Environmental Compensation Mechanism

The cognition of internationalization is divided into six aspects: international attitude, subjective norm, perceived behavioural control, dual cognitive, internationalization behaviour, and internationalization performance. Two aspects will affect satisfaction which are international attitude and perceived behavioural control.

1. International attitude: if companies are willing to actively improve the international operation methods such as offices, subsidiaries or joint venture

companies, together with undertake and grasp the risks and opportunities in the process of internationalization, and willing to participate in the international division of labor and cooperation like the division of labor contracts with foreign companies, joint production, etc., then the stakeholders' satisfaction of environmental compensation mechanism will high.

2. Perceived behavioral control: if enterprises can utilize domestic market resources as well as the ability to utilize foreign market resources, take advantage of domestic government policy resources and make use of foreign policy and government resources, then the stakeholders' satisfaction of environmental compensation mechanism will high.

3.

Recommendation

According to the conclusion in above sections, the following three research recommendations are demonstrated:

1. From the perspective of policy

From nation aspect:

1. Establish an investment and financing system in which the government provides the main input and the whole society supports ecological and environmental improvement.

First of all, with government input as the main factor, it is necessary to play the government's intervention role in the compensation process and lead the issuance of relevant supporting policies and implementation rules. Secondly, it is necessary to stimulate the participation of the whole society to support and encourage social funds to participate in the investment of ecological construction and environmental pollution control. Diversified and comprehensive forms of compensation, such as ecological compensation for education, personnel training, vocational training and industrial relocation, will be carried out to establish a sound investment and financing system to support ecological construction eventually.

From the local government aspect:

2. The government should set up appropriate incentives actively to encourage the production and use of alternative energy sources.

Applying economic incentives (such as tax cuts) to reduce costs and encouraging the participation of financial institutions to overcome the high upfront costs and long payback periods; Reducing widespread subsidies, subsidizing the vulnerable through alternatives, and pricing the carbon to overcome the low price of energy.

3. The government should specify corresponding environmental protection tax policies.

Specify from the perspective of air pollutants, water pollution pollutants, solid waste, and noise pollution. Such as the corresponding pollution magnitude of air and water pollutants, the emission value of solid waste, and the decibel level of noise pollution.

From the education aspect:

4. Inviting environmental experts to join the team of environmental activities.

Through setting up the leading group of school environmental education work, forming the system of environmental education activities in and out of school, making environmental education become an effective carrier of deepening quality education. Then training, lectures, seminars, counseling, topic research and other ways to promote teachers' environmental education ability and teachers and students to improve environmental awareness.

From the corporate aspect:

5. Set up professional research groups for the scientific and theoretical research on environmental compensation mechanism.

Allian with other countries to build trans-regional joint laboratories and carry out important potential ecological cooperation research. In addition, by building a big data monitoring and analysis platform, leading the construction of a biosafety information sharing platform, and establish an information exchange mechanism for invasive organisms with neighboring countries.

From social aspect:

6. Establish community environmental protection activity volunteer team.

Through the establishment of the benign operation of the management mechanism, increase the voluntary undertaking the propaganda, improve the volunteer registration system, establish and improve the volunteer incentive mechanism, strengthen the training of community volunteers, and to establish community service information resource sharing platform to protect the community environmental protection activities volunteer team's feasibility and sustainability.

2. From the perspective of activities

1. Increase the publicity of environmental protection.

Public the environmental protection through meetings, medias, on the spot, and supervision. Set up environmental protection propaganda board, environmental protection information desk, broadcast environmental protection propaganda video, carry out signature activities, distributing environmental protection shopping bags, aprons and other environmental protection publicity supplies, etc.

2. Promote and demonstrate the accumulated experience of environmental compensation mechanism in other regions and combine with local conditions.

By combining the local social and economic development status and resource and environmental endowment conditions, we will study the reform measures, experience and practices of the authorities, enterprises and the public at all levels in the pilot area. For the measures that can be implemented, we should implement them based on careful study and local actual conditions. In addition, the combination of top-level design and gradually promote the formation of universally applicable institutional arrangements for ecological progress, and further clarified through laws and regulations and implemented in a wider range of areas are needed as well.

3. Increase communication activities between the government and the public.

Improve communication between the government and the public through open design proposals, public suggestions and transparency in project cost monitoring.

3. From the perspective of future research

1. Improve the production process and manufacturing technology;

By advocating the Environmentally Conscious Manufacturing. Conduct a life cycle assessment of the health and environmental impact of products and packaging such as agile manufacturing. During production process, the Priority of material selection should be given to non-toxic, harmless, easy to degrade or easy to recycle.

2. Improve the energy efficiency.

Take the biomass power station as an example, the fuel for power generation is derived from local biomass wastes such as fruit shells and wood chips, which effectively solves the pollution problem of waste incineration in the open air. The ash is used as high-quality fertilizer for local crops, which not only reduces solid waste, but also provides high quality fertilizer. Through the combination of low carbon, zero carbon, negative carbon and other green technology and industrial application, to achieve the purpose of improving energy efficiency.

3. Increase the green design part of engineering projects.

On the condition of ensuring the quality and benefit of the project, the sustainable design and community-centered design concept of the project should be added, and the innovation and technological progress of the project should be investigated.

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APPENDIX

APPENDIX A FINAL QUESTIONNAIRE

泰国背景下中国承包商重大工程项目社会责任

Strategic Management Model for Megaproject Social Responsibility in Supply Chain: The Chinese International Contractor Perspective Operating in Thailand.

******本问卷分为中文和英文两种语言，请根据自己的情况阅读，感谢您的配合。**

****** This questionnaire is divided into two languages, Chinese and English, please read according to your own situation. Thanks for your cooperation.**

尊敬的先生/女士：

您好！本人目前在泰国那黎宣大学在读博士，研究的方向为“在泰国背景下中国承包商重大工程社会责任战略模型”，我需要您的帮助来完成关于重大工程社会责任战略模型的研究!

我国是世界上首屈一指的重大工程建设大国，在重大工程关键技术、组织实施、工程战略资源整合等方面取得了重大成果。但是，随着全球性的社会、环境、工程复杂性等问题的出现，人类命运共同体已经成为前所未有的严峻挑战。为了在泰国的环境背景下对这一问题进行研究，我们设计了在这份调查问卷。

本问卷的问题没有对错之分，您在填写的过程中无需署名，我们将秉承科研人员对学术研究的客观、严谨等特质对您的答卷进行保密。您可能需要15分钟左右的时间进行填写，每一项对我们的研究来说都非常的重要，再次深深感谢您的配合与理解!

问卷说明：

社会责任是指企业在创造利润、对股东承担法律责任的同时，还要承担对员工、消费者、社区、环境以及尊重当地文化的责任，强调在生产的过程中对人的价值的重视，强调对环境、消费者、社会的贡献。

本研究从重大工程的角度出发，在泰国的背景下，重在各参与方所超越组织目标而履行的社会任务。针对项目生命周期的不同以及每个生命周期利益相关者的不同，分别从经济、法律、伦理道德、政治等方面考察项目生命周期各参与方对社会的义务。

由于重大工程社会责任的高度复杂性，问卷设计好之后，得到泰国数名专家的建议，进行了简化处理后选

取了相对重要的指标。请在填写问卷时，根据个人感知和意识对每个条目进行重要性或认同度判断。

Dear Sir/Madam,

Hello! I am currently a Ph.D. candidate in Naresuan University, Thailand. My research direction is "Megaproject Social Responsibility Strategy Model of Chinese Contractors in the Context of Thailand". I would like to ask for your assistance to complete the research on social responsibility strategy model of megaprojects.

As the world's leading megaproject construction country, China has made great achievements in key technology, organization and implementation of major projects, and integration of project strategic resources. However, with the emergence of global social, environmental and engineering complexity issues, it has become an unprecedented challenge to focus on the community of shared future for mankind. In order to conduct research on this issue in the context of Thailand, we designed this questionnaire.

There are no right or wrong questions in this questionnaire. You do not need to sign your name when you fill in the questionnaire. We will keep your answers confidential in accordance with the objectivity and rigor of scientific research staff. You may need 15-25 minutes to fill in this questionnaire. Each item is very important for our study. Thank you again for your cooperation and understanding!

Questionnaire Description:

Social responsibility means that while creating profits and assuming legal responsibilities to shareholders, an enterprise should also assume responsibilities for employees, consumers, communities, the environment and respect for local culture. It emphasizes the attention to human value in the process of production and the contribution to the environment, consumers and society.

From the perspective of major projects, in the context of Thailand, this study focuses on the social tasks performed by the participants beyond the organizational goals. In view of the difference of project life cycle and the difference of stakeholders in each life cycle, the

obligations of each participant in project life cycle to society are investigated from the aspects of economy, law, ethics, politics, etc.

Due to the high complexity of social responsibility of major projects, the questionnaire was designed, and several experts from Thailand advised to simplify the process and select relatively important indicators. When filling in the questionnaire, please judge the importance or identity of each item according to your personal perception and consciousness.

1. 个人信息

请根据实际情况填写您的个人信息。

1. Demographic Information

Please Please fill in your personal information according to the actual situation.

1.1 您的性别?

Your gender is? [单选题] *

○男 Male

○女 Female

1.2 您是否有宗教信仰?

What's your religion [单选题] *

○佛教 Buddhism

○伊斯兰教 Islam

○基督教 Christian

○无宗教信仰 No Religion

○其他 Other

1.3 您在大型项目行业工作了多少年?

How many years have you worked in the megaproject industry? [单选题] *

○1-5 年 years

○6-10 年 years

○大于10年 More than 10 years

○我不从事该行业 I'm not in that line of work

1.4 您的最高学历是?

Please specify your highest education?

[单选题] *

○博士 Ph.D

○硕士 Master

○学士 Bachelor

○大专 Diploma/College

○高中 High school

○高中以下 Under the high school

1.5 您对社会责任熟悉吗?

Are you familiar with social responsibility?

[单选题] *

○从来没有听说过 Never heard at all

○有一点了解 A little understanding

○有清晰了解 Have clear understanding

○知道的较多 Know more about this

○非常熟悉 Very familiar

1.6 您是通过什么渠道学习到社会责任的?

How did you learn about social responsibility? [多选题] *

□大众媒体，如报纸和电视 Mass media such as newspapers and television

□网络 Internet

□培训与学习 Training and learning

□社交场合 Social occasions

□其他 Others

1.7 您在参与大型工程项目当中属于以下哪个角色?

For megaprojects, which of the following groups do you belong to? [单选题] *

○中国承包商/分包商 Chinese contractor or Sub-contractor

○中央政府或地方政府 The central government or local government

○设计方 Designer

○分包商 sub-contractor

○项目法人 project legal

○供应商 supplier

○项目监理 project supervision

○非营利性组织 NGO

○媒体 media

○社区群众 community or public

2. 对社会责任的评价

本部分为工程项目建设中所对应阶段的社会责任情况调查

2. Evaluation of social responsibility

This part is divided into the corresponding stage of the project construction in order to investigate the performance of social responsibility in those stages.

[矩阵单选题] *

	完全没有 Don't have	很少有 Rare	一般 Normal	偶尔有 Often	经常有 Always
项目立项阶段 Project initiating stage					
2.1 在项目立项阶段，政府提供了该项目给当地所带来的经济效益预测报告 During the project launch period, the government provided a forecast report on the economic benefits that the project would bring to the local area	○	○	○	○	○
2.2 在项目立项阶段，政府考量了该项目对每个参与人员的经济方面影响 During the project initiation phase, The government considered the financial impact of the project on everyone involved	○	○	○	○	○
2.3 在项目立项阶段，政府对项目的技术难度的可行性进行了分析 During the project launch period, the government analyzed the feasibility of the technical difficulties of the project	○	○	○	○	○
2.4 在项目立项阶段，政府积极组织了公众参与，如公开听证会 During the project initiation phase, the government actively organized public participation, such as public hearings	○	○	○	○	○
2.5 在项目立项阶段，政府考量了项目对环境、生态的影响，并且有环境评估报告（EIA） During the project initiation phase, The government considers the environmental and ecological impact of the project, and has the environmental assessment report (EIA)	○	○	○	○	○
2.6 在项目立项阶段，政府考量了项目有尊重宗教、民族、文化的情况（如布	○	○	○	○	○

施） In the project establishment stage, the government considers the situation that the project respects religion, nationality and culture (such as alms giving)					
2.7 在项目立项阶段，媒体公正的报道了与项目有关的宣传活动的合法性 During the project establishment phase, the media fairly reported the legitimacy of the publicity activities related to the project	○	○	○	○	○
2.8 在项目立项阶段，媒体跟进了与项目有关的伦理道德及环境问题 During the project establishment stage, the media always paid attention to the ethical and environmental issues related to the project	○	○	○	○	○
2.9 在项目立项阶段，媒体跟进了社区与公众的需求 During the project initiation stage, the media paid attention to the needs of the community and the public	○	○	○	○	○
项目设计阶段 Project design stage					
2.10 在项目设计阶段，设计方在采用了在保证设计质量的情况下的经济最优的设计理念 In the design stage of the project, the designer adopts the economical optimal design concept under the condition of ensuring the design quality	○	○	○	○	○
2.11 在项目设计阶段，设计方考量了项目在创新和科技进步上的情况 In the design stage of the project, the designer considers the project's innovation and technological progress	○	○	○	○	○
2.12 在项目设计阶段，设计方积极使用了可持续设计及绿色设计理念 In the design stage of the project, the designer actively uses the concept of sustainable design and green design	○	○	○	○	○

2.13 在项目设计阶段，设计方采用对以社区为中心的设计理念 In the design phase of the project, the designer adopts the concept of community-centered design	○	○	○	○	○
2.14 在项目设计阶段，政府有公开项目的设计方案 During the project design stage, the government made public the project design scheme	○	○	○	○	○
2.15 在项目设计阶段，政府有积极听取公众对设计方案提出的建议 During the design phase of the project, the Government actively listened to the public's suggestions on the design scheme	○	○	○	○	○
2.16 在项目设计阶段，政府有对项目的设计成本进行监管 In the project design stage, the government supervises the design cost of the project	○	○	○	○	○
项目建设阶段 Project construction stage					
2.17 在项目建设阶段，项目法人对工程质量和安全施工进行了监控 During the construction phase of the project, the project legal person shall monitor the project quality and safety construction	○	○	○	○	○
2.18 在项目建设阶段，项目法人确保了资金安全及合理回报 During the construction phase of the project, the project legal person ensures the security of funds and reasonable returns	○	○	○	○	○
2.19 在项目建设阶段，项目法人采纳了绿色建造理念 In the construction phase of the project, the project legal person adopts the concept of green construction	○	○	○	○	○
2.20 在项目建设阶段，项目法人积极注重周边社区及公众的需求 2.20 During the construction phase of the project, the	○	○	○	○	○

project legal person shall pay active attention to the needs of the surrounding communities and the public					
2.21 在项目建设阶段，承包商控制了工程的成本和工期 During the construction phase of the Project, the Contractor strictly controlled the cost and duration of the Project	○	○	○	○	○
2.22 在项目建设阶段，承包商有对施工技术进行创新改进 During the construction phase of the project, the contractor innovates and improves the construction technology	○	○	○	○	○
2.23 在项目建设阶段，承包商对施工阶段的资源进行了合理循环利用 During the construction phase of the project, the contractor has carried out reasonable recycling and utilization of resources in the construction phase	○	○	○	○	○
2.24 在项目建设阶段，承包商遵守了法律法规及行业规范 During the construction phase of the Project, the Contractor complied with laws, regulations and industry norms	○	○	○	○	○
2.25 在项目建设阶段，承包商确保了工程质量和施工安全 During the construction phase of the Project, the Contractor ensured the quality of the Works and construction safety	○	○	○	○	○
2.26 在项目建设阶段，承包商对工地周边的社区、地区采取了生态环境保护措施 During the construction phase of the project, the contractor took measures to protect the ecological environment of the surrounding communities and areas	○	○	○	○	○
2.27 在项目建设阶段，承包商有积极维	○	○	○	○	○

护工地周边社区关系 During the construction phase of the project, the contractor actively maintains the community relations around the site					
2.28 在项目建设阶段，承包商有积极处理施工紧急公共事件 During the construction phase of the project, the contractor actively deals with emergency public events during construction	○	○	○	○	○
2.29 在项目建设阶段，监理方有对工程质量和安全进行监督 During the construction phase of the project, the supervisor shall supervise the project quality and safety	○	○	○	○	○
2.30 在项目建设阶段，监理方有对项目施工员工的权益监督 During the construction phase of the project, the supervisor shall supervise the rights and interests of the project construction staff	○	○	○	○	○
2.31 在项目建设阶段，监理方有对项目的环境保护措施进行监督 During the construction phase of the project, the supervisor shall supervise the environmental protection measures of the project	○	○	○	○	○
2.32 在项目建设阶段，供应商有保障施工材料的质量 In the construction phase of the project, the supplier shall guarantee the quality of construction materials	○	○	○	○	○
2.33 在项目建设阶段，供应商有积极推广及使用绿色材料 In the construction phase of the project, the supplier actively promotes and uses green materials	○	○	○	○	○
项目运营阶段 Project operating stage					
2.34 在项目运营阶段，运营商有对工程	○	○	○	○	○

进行日常维护 During the operation phase of the project, The operator carries out routine maintenance on the project					
2.35 在项目运营阶段，运营商有控制工程的运营成本和质量 In the project operation stage, the operator shall control the operation cost and quality of the project	○	○	○	○	○
2.36 在项目运营阶段，运营商有遵守法律、行业规范及合同约定 During the operation phase of the project, the operator shall comply with laws, industry norms and contract provisions	○	○	○	○	○
2.37 在项目运营阶段，运营商有对资源进行合理利用 In the operation stage of the project, the operator makes reasonable use of resources	○	○	○	○	○
2.38 在项目运营阶段，运营商有对社区、地区生态环境进行保护 In the project operation stage, the operator has to protect the community and regional ecological environment	○	○	○	○	○
2.39 在项目运营阶段，运营商有积极维护与社区的关系 In the operation phase of the project, the operator actively maintains the relationship with the community	○	○	○	○	○

3. 大众参与环境活动的程度

本部分考察的是您在项目的整个周期过程当中，做出的各种有利于环境保护的活动/行为的程度（不论活动大小），请根据您个人的感知以及实际情况来填写。

3. Stakeholder Environmental Activities Participation during the Project Life-cycle (SEAP-PL)

This section examines the various activities/behaviors that you have done in favor of environmental protection during the whole cycle of the project (regardless of activity size). Please fill in according to your personal

perception.

[矩阵单选题] *

	完全没有 Don't have	很少有 Rare	一般 Normal	偶尔有 Often	经常有 Always
3.1 有注意承包商/分包商是否使用了环保的建筑材料 There are concerns about the use of environmentally friendly building materials by contractors/subcontractors	○	○	○	○	○
3.2 有注意承包商/分包商定是否期将垃圾堆放在指定位置 There is concern that the contractor/subcontractor will agree to place the garbage dump in the designated location	○	○	○	○	○
3.3 有注意承包商/分包商是否将运输车辆重新干净后再上马路 There is concern about whether the contractor/subcontractor has cleaned the transport vehicles before driving on the road	○	○	○	○	○
3.4 有注意项目相关人员是否定期参与环境保护教育 There are concerns about whether people involved in the project regularly participate in environmental protection education	○	○	○	○	○
3.5 有注意政府是否在各个区域定点设定了垃圾桶 There are concerns about whether the government has targeted garbage bins in various areas	○	○	○	○	○
3.6 有注意政府是否制定了保护环境政策及措施，且在这个过程中我能学到很多环境保护知识 There are concerns about whether the government has formulated and implemented environmental protection policies and measures. In this process, I can learn a lot of environmental protection knowledge	○	○	○	○	○
3.7 有注意政府、媒体等是否积极宣传环	○	○	○	○	○

境保护的重要性，会给项目提出自己对环境保护的建议 There are concerns about whether the government media actively publicize the importance of environmental protection, and put forward my own suggestions on environmental protection to the project					
3.8 有注意媒体是否对环境保护措施做得好的企业或个人进行公开表彰 There are concerns about whether the media have publicly praised enterprises or individuals who have done well in environmental protection measures	○	○	○	○	○
3.9 有注意项目法人、承包商等是否积极采用绿色设计，如使用太阳能、风能等 Pay attention to whether the project legal person and contractor actively adopt green design, such as solar energy and wind energy, etc	○	○	○	○	○
3.10 给项目有关人员提出自己对他们所做的保护环境工作的看法 Give your opinion to the people involved in the project about what they are doing to protect the environment	○	○	○	○	○
3.11 有注意群众自觉进行垃圾分类投放，不乱丢垃圾 There are concerns about people consciously classify garbage and do not litter	○	○	○	○	○

4. 您对环境补偿措施的满意程度

本部分考察您们对环境补偿措施的满意程度，环境补偿措施指的是以保护生态环境、促进人与自然和谐为目的，调整生态环境保护和建设相关各方之间利益关系的一种制度安排，如：谁污染谁治理，谁破坏谁保护。请根据您的个人感知进行填写。

4. Satisfaction with the Environmental Compensation Mechanism (ECM) This section examines the stakeholders' satisfaction with the environmental compensation mechanism. The environmental compensation measure refers to an institutional arrangement that adjusts the interest relations between the parties concerned in the ecological environmental protection and construction for the purpose of protecting the ecological environment and promoting the harmony between man and nature. For example, whoever pollutes will be responsible for the treatment, and whoever destroys will be responsible for the protection. Please fill in according to your personal perception.

[矩阵单选题] *

	很不满意 Unsatisfied at all	不满意 Unsatisfied	一般 Normal	满意 Satisfied	很满意 Very satisfied
您对项目实施过程中环境治理情况的满意程度 How satisfied you are with the environmental governance during the project implementation					
4.1 噪音污染 Noise pollution	○	○	○	○	○
4.2 废水废气污染 Waste water and waste gas pollution	○	○	○	○	○
4.3 粉尘污染 Dust pollution	○	○	○	○	○
4.4 废弃物污染 Solid waste pollution	○	○	○	○	○
4.5 光污染 Light pollution	○	○	○	○	○
4.6 有毒有害废弃物的排放 Discharge of toxic and hazardous wastes	○	○	○	○	○
4.7 其他污染 Other pollution	○	○	○	○	○

您对目前环境补偿措施的满意程度 Your satisfaction level of current environmental compensation measures					
4.8 公众自觉守护环境卫生 The public consciously protects environmental hygiene	○	○	○	○	○
4.9 环保专家积极推动环保活动 Environmental experts actively promote environmental protection activities	○	○	○	○	○
4.10 企业改进生产工艺、制造等技术减少对环境的污染 The enterprise shall improve the production process and manufacturing technology to reduce environmental pollution	○	○	○	○	○
4.11 企业提升能源使用效率 Companies improve energy efficiency	○	○	○	○	○
4.12 建立以政府投入为主、全社会支持生态环境建设的投资融资体制 An investment and financing system with government investment as the main component and the whole society supporting ecological environment construction shall be established	○	○	○	○	○
4.13 政府支持替代能源的生产和使用 The government supports the production and use of alternative energy sources	○	○	○	○	○
4.14 政府制定的环境保护税收政策 The government formulates tax policies for environmental	○	○	○	○	○

protection					
4.15 研究者为完善环境补偿措施提供的科技和理论支撑 Scientific and theoretical support provided by researchers for improving environmental compensation measures	○	○	○	○	○

5. 您对国际化的认知程度

5. How much you know about internationalization

[矩阵单选题] *

	完全不同意disagree at all	不同意 disagree	一般 normal	同意 agree	非常同意 agree at all
国际化态度 International attitude					
5.1 企业愿意积极改进国际化运营方法，如设办事处、子公司或合资公司等 Company is willing to actively improve the international operation methods. Such as offices, subsidiaries or joint venture companies	○	○	○	○	○
5.2 企业愿意承担和把握国际化过程中的风险和机遇 Company is willing to undertake and grasp the risks and opportunities in the process of internationalization	○	○	○	○	○
5.3 企业愿意参与国际化分工与合作，如与外商签订分工合同，联合生产等 Enterprises are willing to participate in the international division of labor and cooperation, such as the division of labor contracts with foreign companies, joint production, etc	○	○	○	○	○
主观规范 Subjective norm					
5.4 国内市场经济变革促使企业需要参与国际	○	○	○	○	○

化经营 The reform of domestic market economy urges enterprises to participate in international operation					
5.5 国际环境的需求为企业国际化发展提供了市场 The demand of international environment provides a market for the internationalization development of enterprises	○	○	○	○	○
5.6 国际合作倡议的国家政策有利于企业海外发展 The national policies of the International Cooperation Initiative are conducive to the overseas development of enterprises	○	○	○	○	○
5.7 参与国际合作倡议的国家政府为本企业国际经营提供了便利 The governments of countries participating in international cooperation initiatives provide convenience for the international operation of the Company	○	○	○	○	○
感知行为控制 Perceived behavioral control					
5.8 企业有能力利用国内市场资源 The enterprise has the ability to utilize domestic market resources	○	○	○	○	○
5.9 企业有能力利用国外市场资源 The enterprise has the ability to utilize foreign market resources	○	○	○	○	○
5.10 企业能够利用国内政府政策资源 Enterprises can take advantage of domestic government policy resources	○	○	○	○	○
5.11 企业能够利用国外政策政府资源 Enterprises can make use of foreign policy and government resources	○	○	○	○	○
双元认知 Dual cognitive					
5.12 企业很熟悉和遵循东道国的法律和市场管理规范 The enterprise is familiar and follows the laws and market management norms of the host country	○	○	○	○	○

5.13 企业能够敏锐洞察到国际市场的变化并把握机会 The enterprise can keenly perceive changes in the international market and grasp opportunities	○	○	○	○	○
5.14 企业与东道国的政府机构联系紧密，能获得支持 The enterprise has close links with the government agencies of the host country and can get support	○	○	○	○	○
5.15 企业考虑国外新的供应商和客户 The enterprise considers new foreign suppliers and customers	○	○	○	○	○
5.16 企业知道国际经营环境高风险的特点，注重采取谨慎、渐进的方法 The enterprise is aware of the characteristics of high risks in the international business environment and attaches importance to a cautious and gradual approach	○	○	○	○	○
国际化行为 Internationalization behavior					
5.17 企业参与国际市场的进出口活动 The enterprise participates in import and export activities in the international market	○	○	○	○	○
5.18 企业与国际市场进行人力资源交流活动 The enterprise conduct human resources exchange activities with the international market	○	○	○	○	○
5.19 企业积极探索国外其他企业的经营合作 The Company actively explore business cooperation with other foreign enterprises	○	○	○	○	○
国际化绩效 Internationalization performance					
5.20 企业在参加国际合作的过程中提升了生产力 Enterprises improve productivity in the process of participating in international cooperation	○	○	○	○	○
5.21 企业参与国际合作的过程中获得了较高的财务收益 Enterprises obtain higher financial benefits in the process of participating in	○	○	○	○	○

international cooperation					
5.22 企业员工对企业从事的国际化经营活动认可度高 Employees have a high degree of recognition for the international business activities of the enterprise	○	○	○	○	○
5.23 海外客户对企业从事的国际化经营活动认可度高 Overseas customers have a high degree of recognition for the company's international business activities	○	○	○	○	○

APPENDIX B 2020.07.02 VISITING GUANGXI CONSTRUCTION

Preliminary data:

1. 贵公司在泰国获得项目的目的是什么？W h a t is y o u r c o m p a n y objectives getting project in Thailand?

- Learn advanced sugar making techniques, means that learning after participating in construction, **Japanese corporation (Mitsui & Co., Ltd. East Asia Bloc) is the owner**.
- Bring Chinese mechanical and electrical equipment to go global, such as boilers and steam turbines, drive those suppliers in China. The first EPC project in Uthai Thani, more than 95% equipment from China, the rest of the equipment will be procured in Thailand. *There is a research question: logistics is a part of the EPC, how to improve the efficiency of the processes of 10,000 cubic tons of equipment (about a set of sugar mill).*
- 80% independent property rights, design, processing, development.

They have established the Sugar Technology Research Institute (R&D) in Lingli, Nanning, China. The institute including equipment, process innovation, industry chain, steel structure, thermal, electric instrument etc. totally eight specialized department. In Guangxi, more than 90% sugar mills were built by Guangxi Construction.

2. 当前贵公司手头有多少个项目？How many projects on hands during this period?

There are 8 to 10 projects at the moment.

After-sales service department: (2 years)

- The maintenance period are 2 years
- The pursuit of craftsmanship and innovation

- In order to better serve the project in Thailand

3. 贵公司在泰国是什么时候开始开拓泰国市场的？When your company start Thai market?

- The first business in 2010--power generator inside the sugar mill in 2011--Uthai project in 2012—preparation company registration information in 2013—registration in 2014.
- Businesses including civil engineering, buildings, CP condo, and the core competitiveness business is sugar mill.

4. 贵公司在泰国是如何获得项目的？贵公司的强项是什么？或者会给业主带来什么好处？How can you get the project in Thailand? What are your strong points or beneficial to the owner?

- Firstly, East Asia Sugar Group (Mipen, 蜜朋) has acquired 35 refineries in Guangxi, in 2010, the CEO of Mipeng has retired, during the cooperation they formed a closely cooperation with each other, and that's why Guangxi Construction have business in 2010 as question 3 answered.
- The strengths are master and completeness of sugar technology, and there has never been an EPC project in Thailand, they can marshal the resources of the sugar industry, this is very hard to achieve even in China.
- Benefits to the owner are reduce a lot of coordination issues between different subcontractors. Other contractors need at least 2 years to finish a project, but they can finish within 1 year (There was a project finish only 6 months because some communication problems happened, finally project finished with high costs). Why the project schedule is that important it is because of the seasonality of sugarcane. From November of that year to April of next year is the sugar cane pressing season. There is no sugar in the sugarcane outside this cycle time. The work in the non-pressing season factory is to process raw sugar (sugar piled up in the warehouse) into refined sugar

(packaged sugar). If the project finished one year later the project will lost. After the trial operation reaches the standard, it will be handed over to the owner. Most of owners are private owners all Chinese.

- In addition, Thailand is different from China, personal responsibility system is acceptable whereas China prefer corporate responsibility system, there are pros and cons of both systems. Advantage of personal responsibility system is no need to establish a company in order to processes authorized issues, yet disadvantage is if accidents or conflicts happened, it's hard to trace to the source. Advantage of corporate responsibility system is easy to find the source, disadvantage is the long processing time. Moreover, close relationship with chambers of commerce and associations are important because the government have no supervise institution.

5. 贵公司在泰国做工程项目的同时有没有包含企业社会责任？做了哪些企业社会责任？做这些社会责任是为您的公司做现在的项目还是将来的项目？Do you know or involving CSR? What kind of CSR do you do? Is it company for your company for present or future project?

- Donation, education, temple, government, police, office, children's day, jobs. Donation: Going to the communities near the sites, most of the sites are in rural or country area, they will donate goods to those communities such as air-condition, desks and chairs according to the village head's demand. But they did not accept cash. Jobs: cook's aunts, securities, drivers, unskilled laborers.

- From the perspective of China, pull Chinese suppliers to go out, from the perspective of Thailand, boost local employment rate. Totally there will be 300-600 workers from China and Thailand respectively, the proportion of nationality of workers around 1:1.

- Importantly, from the aspect of meso view (industry), Guangxi Construction would like to learn technology from Thai since the industry skills of sugar in Thailand is better than in China. From the aspect of micro view, personal skill

of Chinese skilled workers are more mature than Thai skilled workers.

6. 贵公司是否有重大工程项目社会责任的经验？如果有，重大工程项目社会责任与企业社会责任的区别是什么呢？Do you have some experience about MSR? What difference about MSR and CSR?

- For example, Uthai Thani is an agricultural province, there is no industrial at all after the Uthai-thani Sugar Mill Project - 12000 TCD & 700 t established. This project requires 24,000 tons of sugarcane per day, they need to harvest at least 80 km of sugarcane which means pull around a lot of farmers planting sugarcane (political & ethical responsibility). In addition, this project became the big local taxpayers (economic responsibility) as well and improve the social status of enterprises.
- The social responsibility of Guangxi Construction is during the construction phase.

7. 中国承包商在泰国承包工程，从政治、经济、文化、环境几个方面分别带来了哪些益处？有其他的可以补充。What are the benefits bringing from Chinese contractors contracting megaprojects to Thailand from the perspectives of politics, economics, culture and environment? Please add if there are other benefits.

- Environment: under EIA regulation such as noise, wastewater etc.
- Economic: pay tax, reduce time costs (reduce project schedule into 1 year), reduce social resource use (EPC mode can reduce the social resources consume), increase employment
- Culture: cultural exchanges, accept local culture.
- Politics: BRI policy to Chinese contractor, Thailand policy to owner.

If there are any conflicts happened during the construction period, contractor need to resolve conflict and the best solution is to find a lawyer, such as communities near the site, but this problem happened only in the residential projects or projects in the city.

8. 中国现在有一带一路政策，那么在这个政策中有哪一些政策会对中国承包商在泰国的承包工作会有重大的影响？China now has a Belt and Road Initiative (BRI) policy, so which of these policies will have a significant impact on the contracting work of Chinese contractors in Thailand?

- From the Chinese contractor view, there is a BRI policy call *Export tax rebate policy for mechanical and electrical products* to encourage exports, the tax rebate is up to 16%. If there is a similar product in Thailand, there will be a business tax charge. Therefore, they prefer to procure the product in Thailand because of the anti-dumping duty.
- From the owner view, regarding to the import products from China, there is a 7% import duty must pay.

In conclusion, in this area there are not that much effect to Chinese contractor in Thailand. The owner will not intervene the BRI tax rebate policy of Chinese contractor, and how the owner reduces tax or other costs have no relationship with Chinese contractor either.

9. 在这个合作过程当中，中国承包商是否还有哪一些可以做的更完善的地方，可以谈一些具体的例子。In the process of cooperation, whether there are any areas where Chinese contractors can do better? We can talk about some specific examples.

- From the perspective of Chinese contractor, strengthen quality inspection in the process of organizing equipment materials is urgent need, especially supervision of the equipment production process. They must be familiar with local standards, laws, regulations and norms.
- From the perspective of suppliers in China, self-discipline of domestic manufacturers is important, once the equipment arrived Thailand, the *wrong version of goods* will cause huge economic loss. Moreover, when Thais receive the goods, they will not say it is the manufacturer's fault, but will raise the quality of products to

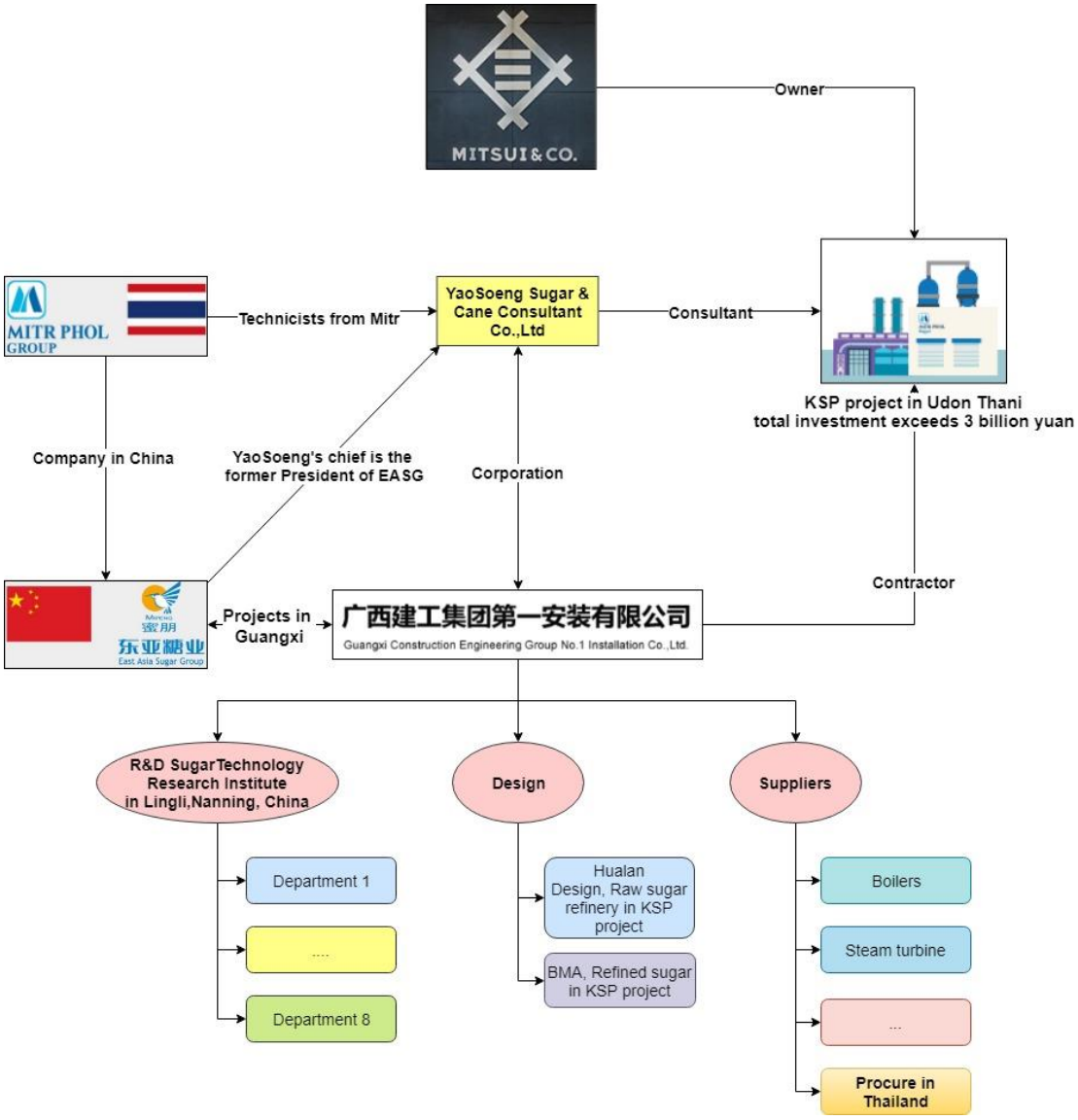
the national level, which is what they often call “Chinese products”.

- From the perspective of Thais, the problem of *wrong version of goods* is not caused by the Chinese supplier unilaterally. Firstly, some Thai people they want to get the best products with lowest price, this will reject by the big brand because of their brand image is very important. In this process, there will be a few small manufacturers are willing to pick up this type of business since they did not care that much about the brand image. Finally, vicious circle will occur, this is called *bad news travel fast*. Secondly, there is no Chinese version of Thai standard, Chinese contractor translate the Thai version by themselves, misunderstanding will occur obviously. The different language version of standards announced by Thai government or any industrial institutes are required.

10. 请问您如何看待宗教信仰与重大工程项目社会责任的关系？可以举例说明。How do you think of the relation between religions and megaproject social responsibility? Please illustrate with few examples.

- It’s depends on different area of Thailand. South of Thailand all Muslim, the rules of Muslim are quite different from Buddhists in other parts of Thailand.
- For example, respect local customs such as there must be statues within a certain area, before the start of construction, the owner will hold some ceremonies on the land and go to worship Buddha on the first and fifteenth of every month.
- Seems like not much useful information.

The relationship map of stakeholders:



APPENDIX C

IOC Main Parts Summary of 5 Experts

Section 1		Demographic Information	*Kul*	*Par*	*RP*	*SMS*	*WNW*	*Avg*
1	**Demographic Information**	Year of birth	*-1*	*1*	*1*	*1*	*0*	*0.4*
2		Gender	*-1*	*1*	*1*	*1*	*0*	*0.4*
3		Religion	*-1*	*1*	*1*	*-1*	*0*	*0*
4		Income	*-1*	*1*	*1*	*0*	*0*	*0.2*
		Position						
5		How many years have you worked in the megaproject industry?	*1*	*1*	*1*	*1*	*0*	*0.8*
6		Please specify your highest education?	*1*	*0*	*1*	*0*	*0*	*0.4*
7		Please specify your major?	*1*	*1*	*1*	*0*	*0*	*0.6*
8		For megaprojects, which of the following groups do you belong to?	*1*	*1*	*1*	*1*	*0*	*0.8*
9		Are you familiar with social responsibility?	*1*	*1*	*1*	*1*	*1*	*1*
10		How did you learn about social responsibility?	*1*	*1*	*1*	*1*	*1*	*1*
Section 2		**MSR Indicators from the Project**	***Kul***	***Par***	***RP***	***SMS***	***WNW***	***Avg***
	Primary SR	**Secondary SR**						
11	**ECOR**	Economic feasibility decision of the project	*1*	*1*	*1*	*1*	*-1*	*0.6*
12		Technical feasibility decision of the project	*1*	*1*	*1*	*1*	*-1*	*0.6*
13		Economic consideration for each stakeholder	*1*	*1*	*1*	*1*	*-1*	*0.6*
14	**LR**	Information disclosure	*1*	*1*	*1*	*1*	*0*	*0.8*
15		Public participation (public hearing)	*1*	*1*	*1*	*1*	*0*	*0.8*
16	**ETHR**	Consideration of environment & ecology	*1*	*1*	*1*	*1*	*0*	*0.8*
17		Respect Religion Ethnic,and Culture (alms giving)	*1*	*-1*	*1*	*-1*	*0*	*0*
18	**PR**	National security, international community's effort, the security of life, the economy and people's livelihood	*1*	*-1*	*1*	*1*	*-1*	*0.2*
19		Focus on local community relations and impact	*1*	*1*	*1*	*1*	*-1*	*0.6*
20	**LR**	Activities are law-abiding	*1*	*1*	*1*	*1*	*-1*	*0.6*
21		Independence and impartiality of reporting	*1*	*1*	*1*	*1*	*1*	*1*

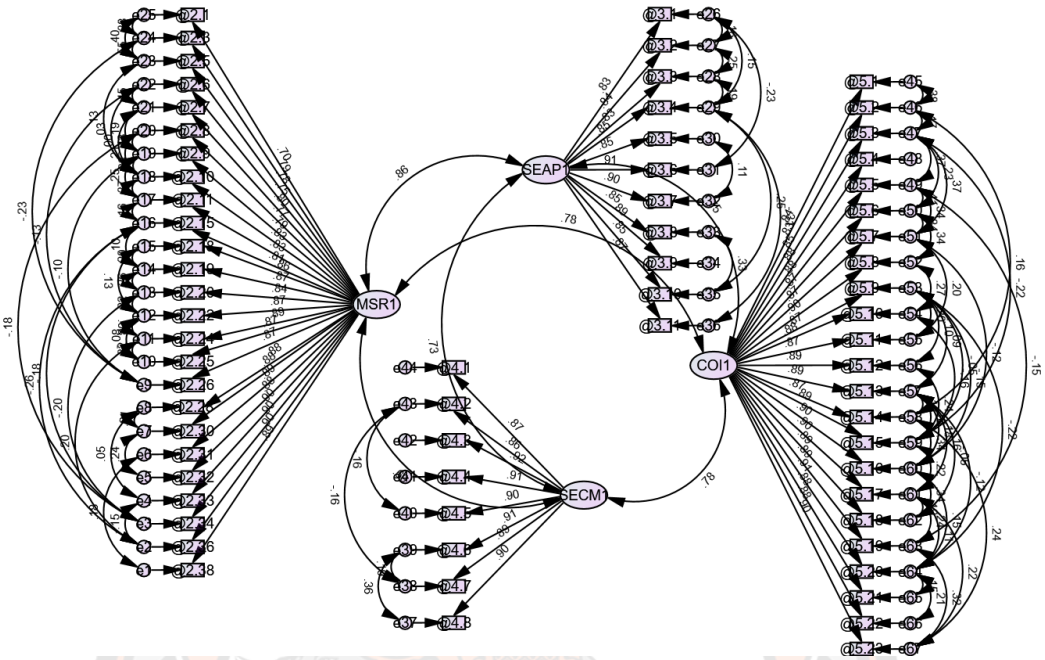
22	**ETHR**	Focus on ethical, religions, and environmental issues	*1*	*1*	*1*	*1*	*1*	*1*
23	**PR**	Focus on local community relations and impact	*1*	*-1*	*1*	*1*	*-1*	*0.2*
	Remark							
24	**ECOR**	Design quality and economic feasibility	*1*	*0*	*1*	*1*	*-1*	*0.4*
25		Innovation and technological progress	*1*	*1*	*1*	*1*	*-1*	*0.6*
26	**LR**	The design conforms to industry standards	*1*	*1*	*1*	*1*	*1*	*1*
27	**ETHR**	Sustainable and Green design	*1*	*1*	*1*	*1*	*1*	*1*
28	**PR**	Focus on community needs	*1*	*-1*	*1*	*1*	*1*	*0.6*
29	**ECOR**	Design considering control for construction cost to be in budget	*-1*	*1*	*1*	*1*	*-1*	*0.2*
30	**LR**	Project design scheme disclosure	*1*	*1*	*1*	*1*	*1*	*1*
31	**PR**	Project design scheme public participation	*1*	*1*	*1*	*1*	*1*	*1*
32	**LR**	Environmental impact assessment (EIA) report	*1*	*1*	*1*	*1*	*1*	*1*
33	**LR**	Public participation report	*1*	*1*	*1*	*1*	*1*	*1*
34		Optimal investment schemes and conditions	*0*	*-1*	*1*	*1*	*0*	*0.2*
	Remark							
35	**ECOR**	Perfect project governance	*0*	*1*	*1*	*1*	*0*	*0.6*
36		Focus on engineering quality and safety construction	*0*	*0*	*1*	*1*	*1*	*0.6*
37		Safe and reasonable return of investment funds	*1*	*1*	*1*	*1*	*1*	*1*
38	**ETHR**	Sustainable and Green construction implementation	*1*	*1*	*1*	*1*	*1*	*1*
39	**PR**	Focus on community and public needs	*1*	*1*	*1*	*1*	*1*	*1*
40		Maintain social stability	*1*	*1*	*1*	*1*	*1*	*1*
41	**ECOR**	Engineering construction quality and safety guarantee	*1*	*0*	*1*	*1*	*1*	*0.8*
42		Project construction cost and time limit control	*1*	*0*	*1*	*1*	*1*	*0.8*
43		Construction technology innovation and progress	*1*	*1*	*1*	*1*	*0*	*0.8*
44	**LR**	Should comply with all laws and regulations of the country (i.e., Thailand) also implement of measure identified in EIA report)	*0*	*1*	*1*	*1*	*1*	*0.8*

45		Reasonable utilization of resources in construction stage and construction waste management	*1*	*1*	*1*	*1*	*0*	*0.8*
46	**ETHR**	Ecological conservation of construction areas	*1*	*1*	*1*	*1*	*1*	*1*
47		Community environmental protection of construction areas	*1*	*1*	*1*	*1*	*1*	*1*
48		Local culture and religious involvement	*1*	*-1*	*1*	*1*	*0*	*0.4*
49	**PR**	Maintain community relations	*1*	*1*	*1*	*1*	*1*	*1*
50		Emergency public event handling	*1*	*1*	*1*	*1*	*1*	*1*
51	**ECOR**	Supervision of project QSHE (Quality, Safety, Health and Environmental)	*1*	*0*	*1*	*1*	*1*	*0.8*
52		Supervision of the rights of project staff and labors	*1*	*-1*	*1*	*1*	*1*	*0.6*
53	**ETHR**	Supervision of the environmental protection of project construction	*1*	*1*	*1*	*1*	*1*	*1*
54	**ECOR**	Quality assurance of construction materials	*1*	*1*	*1*	*1*	*1*	*1*
55	**ETHR**	The use and promotion of the green materials	*1*	*1*	*1*	*1*	*1*	*1*
56	**ETHR**	Supervision of the construction industry	*1*	*-1*	*0*	*1*	*0*	*0.2*
57	**ECOR**	Ensure the use of funds	*1*	*1*	*1*	*1*	*0*	*0.8*
58		Ensure the health and safety of staff and local	*0*	*-1*	*1*	*1*	*1*	*0.4*
59	**ETHR**	Local culture and religious involvement	*1*	*1*	*1*	*1*	*-1*	*0.6*
60	**LR**	Transparency information of funds and activities	*1*	*1*	*1*	*1*	*-1*	*0.6*
	Remark							
61	**ECOR**	Regular maintenance	*1*	*1*	*0*	*1*	*1*	*0.8*
62		Project operation cost control and quality assurance	*1*	*0*	*1*	*1*	*1*	*0.8*
63	**LR**	Operating in compliance with the laws and industrial regulations, and contract agreement	*1*	*-1*	*1*	*1*	*1*	*0.6*
64	**ETHR**	Regional ecological and environmental protection	*1*	*0*	*1*	*1*	*1*	*0.8*
65		Community environmental protection	*1*	*-1*	*1*	*1*	*1*	*0.6*
66		Reasonable utilization of resources	*1*	*-1*	*1*	*1*	*1*	*0.6*
67	**PR**	Maintain community relations	*1*	*-1*	*1*	*1*	*0*	*0.4*
	Remark							

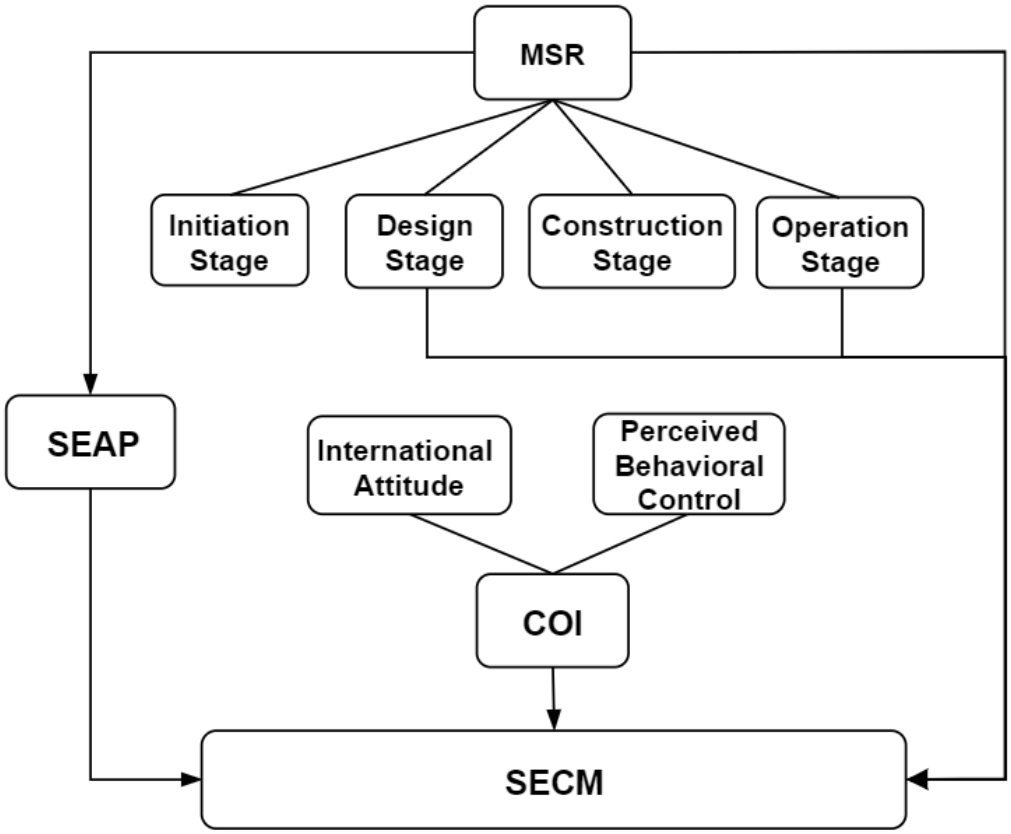
Section 3		Stakeholder Environmental Activities Participation during Project Life-cycle (SEAP-PL)	*Kul*	*Par*	*RP*	*SMS*	*WNW*	*Avg*
68		Have you ever been involved in environmental activities of megaprojects?	*1*	*1*	*1*	*1*	*0*	*0.8*
69		Which phases you have attended to protect environment during the project-lifecycle? (MCQ)	*1*	*1*	*1*	*1*	*0*	*0.8*
70		Factors affecting my participation in environmental activities:	*1*	*1*	*0*	*1*	*0*	*0.6*
71		Because of the publicity of environmental activities	*1*	*1*	*1*	*1*	*0*	*0.8*
72		Because of company assignment	*1*	*1*	*1*	*1*	*0*	*0.8*
73		Because of the laws and regulations	*1*	*1*	*1*	*1*	*0*	*0.8*
74		Because I follow the policy of the host country	*1*	*1*	*1*	*1*	*0*	*0.8*
75		Because I have free time	*0*	*1*	*-1*	*1*	*-1*	*0*
76		Because of my daily habits/professionalism	*1*	*1*	*0*	*1*	*0*	*0.6*
77		Because it impacts on me and my children's daily life	*1*	*1*	*1*	*1*	*-1*	*0.6*
78		Because I know project brings drawbacks to environment	*1*	*1*	*1*	*1*	*-1*	*0.6*
79		Because environmental issues will affect the development of economic	*1*	*1*	*1*	*1*	*0*	*0.8*
80		Projects involving international contractors will enhance my involvement in pollution and control	*1*	*1*	*1*	*1*	*0*	*0.8*
81		Project involving international contractors will enhance my involvement in ecological and environmental protection	*1*	*1*	*1*	*1*	*0*	*0.8*
Section 4		**Environmental Compensation Mechanism (ECM)**	***Kul***	***Par***	***RP***	***SMS***	***WNW***	***Avg***
82		Whoever causes pollution is responsible for its treatment	*1*	*1*	*1*	*1*	*-1*	*0.6*
83		The government changes citizen behavior and private enterprises are actively involved in environment protection activities by means of coercion, support and guidance	*0*	*1*	*1*	*1*	*-1*	*0.4*

84		Promote environmental protection through environmental experts, enterprises reform	*1*	*1*	*1*	*1*	*-1*	*0.6*
85		Companies themselves improve technology and reduce pollution	*1*	*1*	*1*	*1*	*-1*	*0.6*
86		Increase the energy efficiency to international standards	*1*	*1*	*1*	*1*	*-1*	*0.6*
87		Increase awareness and cognition	*1*	*1*	*1*	*1*	*0*	*0.8*
88		Increase the production, use, and market of alternative energy and other resources	*1*	*1*	*1*	*1*	*0*	*0.8*
89		Establishment of Council	*0*	*-1*	*1*	*1*	*0*	*0.2*
90		Relative policies establish by the central government and local government	*1*	*1*	*1*	*1*	*0*	*0.8*
Section 5		**Degree of Internationalization of Chinese Contractor in Thailand (DOICC)**	***Kul***	***Par***	***RP***	***SMS***	***WNW***	***Avg***
91	The firm's international performance	Foreign Revenue of Total Revenue (FRTR) in Thailand	*1*	*1*	*1*	*1*	*1*	*1*
92		Assets in Thailand	*0*	*1*	*1*	*1*	*1*	*0.8*
93		Proportion of overseas staff	*1*	*1*	*1*	*1*	*1*	*1*
94	Corporate Business Division (MCQ)	What parts of Thailand is your business located in?	*0*	*1*	*1*	*-1*	*1*	*0.4*
95		What industries are your business in Thailand?	*1*	*1*	*1*	*-1*	*1*	*0.6*
96	Overseas management structure of the company	Local agent, representative office or liaison office, subsidiary company, joint venture company, branch company (sole proprietorship) certified by the govt. of China	*1*	*1*	*0*	*1*	*-1*	*0.4*

APPENDIX D



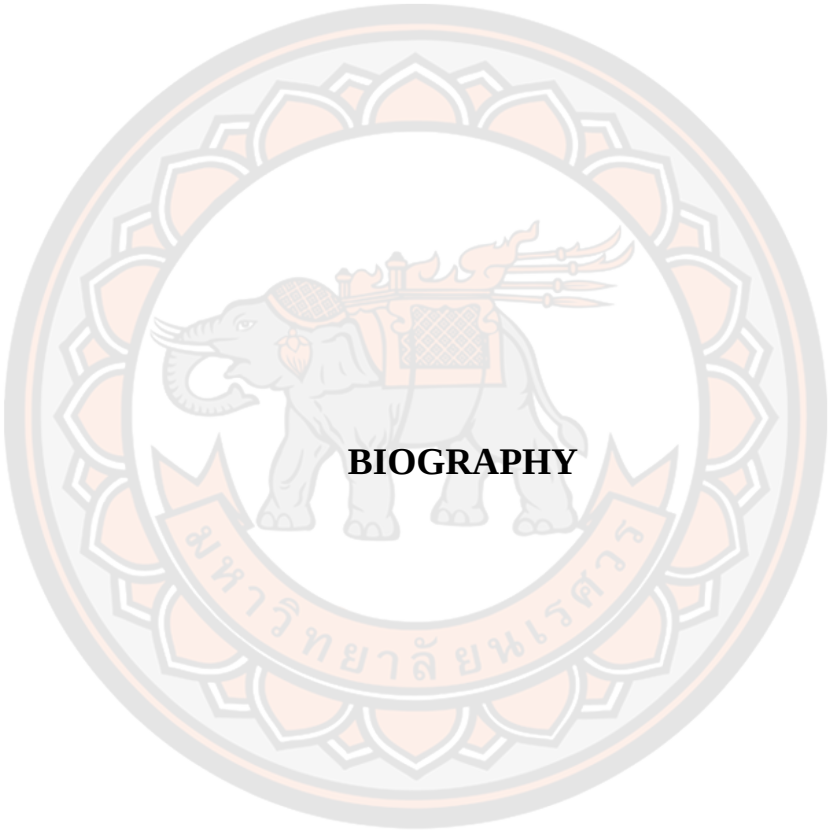
APPENDIX E


MSR
Initiation Stage
Design Stage
Construction Stage
Operation Stage
SEAP
International Attitude
Perceived Behavioral Control
COI
SECM

APPENDIX F

CSR Behavior & Concept classifying by period		
Short term (build strong reputation quickly)	**Medium term** (production-process CSR activities. 2009: CSR activities in award-winning Thai companies)	**Long term** (strategic cooperation)
Donation (air-con, desks etc.)	Educational fund	Pay tax
Children's Day	Healthcare	Ethical code
Alms giving	UNICEF (United Nations International Children's Emergency Fund)	Employment (eg. pull farmers planting sugarcane)
Police office	Reforestation	Waste recycling (bagasse, palm shell, rubber tree wood)
Flea market	Green supply chain during construction period (Pollution control): Prefabricated concrete box girder	Product quality supervision
Complimentary air purifier to community around the site	Facebook page to increase transparency: Environmental and Social Impact Assessment (ESIA) and disseminated other project information	Organizational Citizen Behaviors (OCBs) from the Environmental aspect
-	-	Internationally accepted sustainable practices in the areas of risk management, environmental protection, human rights, and foreign labor (Mitr Phol)
-	-	Learn and accumulate experience such as green construction, and promote and apply to other projects, so as to improve social performance (2017)
-	-	At present, the management and practice of social responsibility in the construction industry is still in its infancy, and the talent supporting and

CSR Behavior & Concept classifying by period		
		system construction is not perfect. However, megaprojects can help organizations to train a group of talents in social responsibility management and practice, and improve the social responsibility management system more systematically (2017)
-	-	MSR performance consolidates or establishes an organizational stakeholder network, through which participating organizations can obtain resources, political capital, social capital, etc., so as to improve their ability to fulfill their social responsibilities. (2017)
-	-	In the Major epidemic disaster--implications from COVID-19: 1. Treat employees well and encourage them; 2. Obey and cooperate with government dispatch; 3. Love and support the community; 4. Good governance of enterprises to achieve enterprise perfection



BIOGRAPHY

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Awards	2020 Best Paper Certificate, 11th Global Conference on Business and Social Scineces Series 2020