Thesis

To benefit the company by integrating CSR activities into the raw material transportation process in domestic project

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EXECUTIVE SUMMARY

CRCC (China Railway Construction Corporation Limited) is one of the largest construction corporations in China, which is dedicated in construction operations. Recent years, the company seeks for their own way of achieving sustainable development, CSR is an essential part in their opinion, and thus the company wants to start from making changes in their domestic raw material transportation process.

In order to investigate the suitable CSR activities that fit for the raw material transportation process; firstly the current situation of domestic raw material transportation process regarding to CSR is analyzed, the research finding shows clear data about how does the current transportation process work, the steps within the process are analyzed step by step, then after having a basic understanding about the process, the problems within the current transportation process is analyzed. The data regarding to the current situation are the basis of whole research. After having a basic understanding of this thesis project, the CSR performance of CRCC in transportation process is analyzed through the use of various models, firstly the non-monetary performance and monetary performance are presented. Then 5 stages of corporate maturity is applied, this model can make the CSR performance evaluation quantifiable. After that the desired situation of CRCC in CSR performance is investigated, by reviewing the successful cases in CSR integration, the possible CSR activity may suitable for CRCC can be discovered. The key section of this thesis research is “CSR integration”. There are two parts in “CSR integration”, the first part is CSR activity implementation plan, it focuses on the specific implementation plan, with high emphasize on the details. Based on the previous analyzed and the data collected through interview, the possible CSR activities can be applied in new transportation process are determined. Then through the use of PDCA cycle the CSR activity implementation plan can be formulated. The other part is transportation process redesign, it focuses on the whole process, with high emphasize on whole. After adding those new CSR activities into the current transportation process, the transportation process is updated, then by the use of supply chain architecture assessment, the comparison between current and new transportation process can be done, this model is the most suitable tool to assess the supply chain architectures, the advices for supply chain redesign can be obtained after the assessment, it is the basis for applying 3D-CE. 3D-CE is the last model used in this section, the new CSR strategy in transportation process can be determined through the use of this model. The last part in research finding is the difficulties in implementation, as well as the possible solutions for avoiding difficulties; the data used in answering this question are collected through case study and interview.

The last two chapters in this thesis are conclusion and recommendation, which summarizes the whole thesis especially the research finding part; the recommendations are given based on the previous analysis in research finding.
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THESIS GLOSSARY

CRCC
China Railway Construction Corporation Limited

CSR
Corporate social responsibility

ERM
Environmentally responsible manufacturing

SOE
State-owned enterprise

MNE
Multinational enterprise

NPD
New product development

SSCM
Sustainable supply chain management

LIME
Lime is a calcium-containing inorganic materials in which carbonates, oxides and hydroxides predominate.

KPIs
Key performance indicator

3DCE
Three-dimensional concurrent engineering
CHAPTER 1 INTRODUCTION

1.1 CASE COMPANY

China Railway Construction Corporation Limited (CRCC) is one of the largest state owned construction enterprises in China. The business of the company covers the engineering contracting, survey & design consultation, industrial manufacturing, real estate development, capital operation, mineral development, logistics and material trade. Currently, the business of the company covers 31 provinces, municipalities and autonomous regions as well as Hong Kong SAR, Macao SAR and more than 45 countries in the world.

Only after China’s joining WTO in 2001, CSR was taken seriously in China due to the severe situation of social irresponsible behavior of business in China and the criticism from overseas. Under the pressure from government and public, CRCC has developed the CSR program since 2008. The company actively devote itself to various public welfare activities, follow the co-construction and community, actively benefit the society and keep in making due contribution to improvement of living environment for people. Such as to provide poverty alleviation aid to the designated regions and devote to disaster relief and reconstruction, those CSR activities mainly focus on the “social impact” of the company.

Currently the company is one of the market leaders in both Chinese and international market. It is one of the world's most powerful and largest integrated construction groups, ranking the 100th among the Fortune Global 500, and 11th among China’s Top 500 Enterprises, as well as 1st among ENR's Top 250 Global Contractors in 2013. It is the largest engineering contractor in China. In order to promote itself with a “green tag” to achieve sustainable development, the company aims to become the market leader in CSR performance, thus the company wants to make improvements in CSR performance, and to proceed with transportation process.

1.2 CASE BACKGROUND

This thesis project only focuses on domestic business activities. As a huge company has many branches all over the world, it is easier to make research on a specific task. Based on the request of the company, the lime transportation process is researched. How the current transportation process works is presented in figure 1-1. At present, there are some basic CSR activities within the process; the specific introduction of the current transportation process will be presented in Ch4. The company desires to make better performance of CSR, and to integrate the “thought of CSR” into each step of the process.
There are two main reasons for choosing lime transportation process: firstly, CRCC takes full responsibility from lime production to transportation, most of the branches are related with transportation process. It also covers various stakeholders; secondly, lime the most common raw material used in construction, because of the character of lime, the “environmental impact” needs to take into account.

Moreover, in recent 2 years, several stakeholder groups from domestic transportation processes complain that the company has not done enough in CRS. It caused the company's attention. For example, the management team is not satisfied with the high energy consumption. They want to integrate the “thought of go green” into the daily work of employee; the employee wants to have a better working condition and welfare; the government and public want the company. As the development of the business, the management team from headquarter of CRCC realized it should be improved; the company should have but has not done enough in domestic projects especially in the transportation process of each domestic project. Thus the management team gave orders to the branch companies that are responsible for each domestic project, and to let them develop and integrate CRS activities into the raw material transportation process, as well as to add a “green tag” to the transportation process.

1.3 PROBLEM STATEMENT

Currently, CRCC wants to do the CSR integration into the raw material transportation process in order to meet the stakeholders' expectation and to benefit the company in long term. However the company has not got a clear plan about what kind of CSR activities can be integrated and how to integrate the CSR activities into the domestic transportation process.

In order to investigate the suitable CSR activities that fit for the raw material transportation process; firstly the current situation of domestic raw material transportation process regarding to CSR should be analyzed by using analysis and diagnostic tools. Then, the desired situation should be presented, as a goal for the implementation. Then the action plan will be completed based on the comparison between current situation and desired situation.
1.4 RESEARCH OBJECTIVE

The objective of this research is to provide recommendations for CRCC to help them integrate CSR activities into the domestic raw material transportation process, then achieve the benefits for long term and sustainable development.

1.5 RESEARCH QUESTION

Main question:
How to integrate CSR activities into the raw material transportation process of CRCC?

The core research object of this project is the “CSR activities” that fit the transportation process, thus the main research question should focus on “how”. It is a kind of implementation plan and process redesign, linking “CSR activities” and transportation process.

The answers of the sub questions are the basis for answering the main research, the research questions were made and confirmed based on the advices from the management team of CRCC. The order of the research questions follows the research process.

In order to conduct the CSR integration, in the beginning of this project it is essential to have a basic understanding of the current transportation process, how does the current transportation process work, as well as the problems within the process, and the CSR performance of the company should be determined. After having a basic understanding of the current transportation process, the desired situation of the company should be investigated. The aim of doing this is to define the gap between the current and desired situation of the company’s performance in transportation process. Then in order to fill in the gap between the current and desired situation of the company, possible CSR activities will be determined. The next step is the main part of this research, which is the main research question “How to integrate CSR activities into the raw material transportation process”, the specific implementation plan will be made. The last step of this research is to discover to possible difficulties in implementation. All the sub questions are determined based on the process described above.

Sub questions1:
What is the current performance of the company in domestic raw material transportation process regarding to CSR?

The first sub question lays a foundation for a better understanding of the research object; then the next question is investigating, analyzing and diagnosing the current performance of the company.
Sub question 2:
What is the desired situation of the company in domestic raw material transportation process regarding to CSR?
The desired situation matches the goal of this project, which should be presented specifically; in order to make the comparison with current situation clearly, and to lay a foundation for finalizing the implementation plan.

Sub question 3:
What CSR activities can be integrated into the domestic raw material transportation process of CRCC?
The first step is investigating the suitable CSR activities that fit for the domestic raw material transportation process; In order to conduct future research smoothly, it is necessary to have a clear view about the whole steps within the raw material transportation process, as well as the requirements for the raw material transportation. Then based on the actual situation of the company to investigate what CSR activities can help the company to fill the gap between current situation and desired situation, as well as linking with the core business objectives, core competencies of CRCC and it can benefit the company in long run.

Sub question 4:
What are the potential difficulties in implementation? How to control and avoid those difficulties?
There must be some potential difficulties in implementation, such as using the existing and potential resources to minimize monitor, controlling the probability of unfortunate event, maximizing the realization of opportunities is necessary. This question is focused on this area.
CHAPTER 2 LITERATURE REVIEW:

This chapter discusses several literature and theories which will be used in this report, in order to guide the company to a successful integration of CSR activities into the transportation process, to help the company achieve benefits in long term.

This chapter begins with various CSR concepts, including CSR in China and sustainable supply chain management, which laid a basic foundation for whole research; it also can be referenced as a part of research background.

Then the models used for CSR performance evaluation are introduced. Fristly the current CSR performance of CRCC is analyzed from the aspect of non-monetary and monetary. In order to have a clear view of how is the company's CSR performance now and how is the desired CSR performance of the company, 5 stages of corporate maturity is applied. Moreover, UN Global Compact is used in this section as well, whether the company embraces universal principles and to partner with the United Nations can be discovered, the current CSR performance of CRCC can be analyzed from 4 aspects in UN Global compact model, they are human rights, labor standards, environment and anti-corruption.

In order to investigate the desired situation, two case studies are referenced; those two cases are from different industry. DHL is in the field of logistics, which is in the same industry with the research object. Although Toyota is in the different field with CRCC but how do they integrate CSR into the value chain still can be a valuable example for the company. Those two cases cover both strategic supply chain and value chain integration, DHL case is strategy oriented, Toyota case with more emphasize on value chain integration. Those successful CSR integration cases can give CRCC examples of what kind of actions they can take to reach successful implementation, as well as the difficulties they may face to.

The next section is the case study of lime transportation, because lime is a corrosive material, the transportation safety can be a potential problem, so case study regarding to the characters of lime is necessary, then the prevention mechanism can be sited out, it is also a part of background information.

Integrate CSR into business is the biggest part, the core of this research is about CSR activity integration and transportation process redesign. In order to update the current transportation process and supply chain, product architecture assessment and 3DCE will be used. Supply chain architecture assessment is used to compare the old and the new transportation process. 3DCE is used to redesign the value chain, the detailed value chain strategies can be discovered based on the analysis.

PDCA cycle is the last part in this chapter, the potential CSR activities can be discovered through the case study and the data collected from interview, PDCA cycle can make those CSR activities to become realistic implementation plan. In the actual
analysis, based on the actual situation of the company, more details are added in each step.

2.1 CSR concepts

Corporate social responsibility is generally understood to be the way a company achieves a balance or integration of economic, environmental and social imperatives which at the same time addressing shareholder and stakeholder expectation (Carroll 1979). Based on the research goal of this thesis project, to have a clear understanding of the basic CSR concepts is essential. The concepts of CSR go through the whole research process, from introduction to research finding, especially the introduction part; it can provide a theoretical foundation for any successful CSR integration cases. This section reviews the different viewpoints on the various aspects of CSR.

2.1.1 CSR in China

CSR was introduced into China from the West just at the beginning of Twenty-first century. Only after China’s joining WTO in 2001, CSR was taken seriously in China due to the severe actual situation of social irresponsible behavior of business in China and the criticism from overseas. (Holz, 2003)

Under the huge pressure form government and public, many companies begin to assume their social responsibilities, such as philanthropic donation, pollution control, and energy saving, and so on.

CSR in China shows two characters, the first one is most socially responsible behaviors of firms are government oriented due to the overwhelming impact of government on economy in China. Second, economic responsibility should be regarded as the first social responsibility by firms, because “economic construction” is the central aim of government and the state. (CNTAC,2006).

Chinese company law regarding to the field of CSR

Since 2004 CSR has become a prominent issue in Chinese academic and policy forums. As this Article shows, in recent years many public and private CSR initiatives have emerged in China. The Chinese government in particular plays an important role in guiding the CSR discourse. The leading example is Article 5 of the 2006 Chinese Company Law, which requires companies to "undertake social responsibility" in the course of business. Another important state-led measure is the promulgation of the CSR principles for the Chinese central-government-controlled companies to follow. Some private initiatives are growing as well, such as the Responsible Supply Chain Association's CSC9000T and the Chinese industrial associations’ joint declaration of the Chinese CSR Industrial Principles.
Increasing public and media concerns, laws, regulations and standards, especially the fully developed concept of harmonious society, all are effective drivers for CSR in China. The **drivers of CSR in China** can be classified into different fields:

**Natural Drivers**
The current extreme environmental concerns impel CSR adoption and practice in China, the achievement in the Chinese economy in the last 30 years have inflicted serious damage on the environment. One estimate by the World Bank underscored that damage caused by water and air pollution in China amounted to USD 54 billion per year (Chan and Welford). In order to face these actual environmental and energy problems, China has adopted its 11th five year plan, and focused on building a resource conservation-oriented and sustainable society. Key specific numerical goals in this plan including:
- 20% reduction in energy consumption intensity per GDP;
- 30% reduction in water consumption intensity per added industrial value
- 60% increase in industrial waste recycling rate
- 10% reduction in major pollutant emissions

**Labor Drivers**
Increasing pressure to protect labor rights and improving the welfare of workers is another important driver for demand CSR in Chinese companies. Major problems in this area including:
- unpaid minimum wages
- unfair employment contracts
- labor disputes
- health and safety issues
- working overtime
- lack of welfare and social security for workers
- unhealthy working condition
- poor protection of women’s right
- wide fluctuations of employees and inequitable employment relationships

(Id and Li 2005; Nordmann, 2005; Ying et al., 2006)

**Legal Drivers**
The new PRC Company Law, which took effect from 1 January 2006, can be regarded as a legislative stimulus for CSR (NPC, 2006). According to Article 5, a company shall accept social responsibility, and not only comply with the laws and administrative regulations but also observe social morality and business ethics (NPC, 2006).

**Market Drivers**
Exports and sales to foreign markets are a key driver for improving CSR performance in China (Zhu et al., 2005). Multinational such as Carrefour, Nike and GE have already imposed CSR assessment on their Chinese suppliers (Ying et al., 2006).

**Political Drivers**
The ‘Scientific Development Concept’ and ‘the Construction of a Harmonious Society’
are the primary political drivers for developing CSR in China, being the central policy guidelines for sustainable development and overall societal balance in China.

The basic information about the CSR in China can provide a foundation for the whole research, it is linked with the overall research background. To have a clear view of the CSR drivers in China can afford the company a basic sight of which field they need to pay attention to in investigating suitable CSR activities, it also can be referenced in investigating the desired situation of the company in CSR performance. For example, the potential CSR activities can be classified into the 5 areas mentioned in this section: nature, labor, legal, market and political.

2.1.2 CSR in logistics
This section reviews the literatures on the topic of sustainable supply chain management and green sustainable transportation in China. Based on a review of the extant literature regarding to these two fields, various areas within the logistics function where sustainability can be implemented can be presented.

Sustainable supply chain management
The conceptualization and management of the environmental and social issues has evolved from “standalone,” through the notion of social responsibility, and finally to the concept of sustainability.

Much of the supply chain research consider to be a part of corporate social responsibility (CSR) and sustainability has occurred in a standalone fashion, in which there has been only a little of the interrelationships among topics such as the labor rights, environmental protection labor rights, working condition and safety, and the fact that these are really components of more holistic concepts of CSR, and sustainability as they apply to supply chain management (Carter and Jennings, 2002).

The study done by Carter and Jennings (2002); Murphy and Poist (2002) viewed standalone activities within a broader conceptualization of CSR. Carter and Jennings (2002) incorporate the social responsibility literature from the management field and utilize Carroll's (1979, 1991) hierarchy of economic, legal, ethical, and discretionary responsibility to place the standalone supply chain management activities within the context of discretionary activities and thus social responsibility.

According to the study done by Carter and Rogers (2008), a conceptual theory building approach is used to synthesize the literature at the time and incorporate complementary theoretical bases to introduce a theoretical framework of sustainability as it is applied to the supply chain – a concept which they refer to as SSCM. At the core of this conceptualization is Elkington's (1998) **Triple bottom line**: the intersection of environmental, social, and economic performance.

**Triple bottom line** a straight forward approach shows that what sustainability means
for an organization, rather than suggesting that firms identify and engage in social and environmental activities which will hopefully help, economic performance, the triple bottom line can directly identify the activities which improve economic performance and dictate the avoidance of social and environmental activities which fall outside of this intersection.

According to the suggestion provided by Carter and Rogers (2008), that engaging in sustainability and sustainable supply chain management in particular, is not discretionary, but rather a requirement, which involves the long-run improvement of an organization's economic bottom line, this is a salient conceptualization that can begin to allow managers to take tangible actions. Examples of the activities that fall within the triple bottom line include cost savings associated with reduced packaging and more effective design for reuse and recycling; lower health and safety costs, as well as reduced turnover and recruitment costs due to safer warehousing and transport and improved working conditions; reduced labor costs in the form of higher levels of motivation and productivity and less absenteeism resulting from improved working conditions; lower costs, shorter lead-times, improved product quality, and lower disposal costs resulting from the implementation of ISO 14000 standards and the use of design for disassembly and reuse; and an enhanced organizational reputation, which can make a firm more attractive to both customers and suppliers (Carter and Rogers, 2008, pp. 370-1).

According to study done by Carter and Rogers (2002) four supporting facets or facilitators of sustainable supply chain management are identify:

1. **Strategy** – holistically and purposefully identifying individual SSCM initiatives which align with and support the organization's overall sustainability strategy;
2. **Risk management** - including contingency planning for both the upstream and the downstream supply chain;
3. **Organizational culture** - which is deeply ingrained and encompasses organizational citizenship, and which includes high ethical standards and expectations (a building block for SSCM) along with a respect for society (both within and outside of the organization) and the natural environment;
4. **Transparency** - in terms of proactively engaging and communicating with key stakeholders and having traceability and visibility into upstream and downstream supply chain operations.

This conceptualization of sustainability which defined by Carter and Rogers (2008, p. 368) will be used in analyzing current background of this research, it also provides some clues for investigating the desired situation of CSR performance. the core of this concept is “the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter organizational business processes for improving the long-term economic performance of the individual company and its supply chains,” can perfectly present the CSR concepts in
the field of sustainable supply chain management.

**Green sustainable transportation in China**

Since 90’s, the development cargo transportation in China has received an unprecedented focus. The supervision of cargo transportation in 90’s was inattentive; it caused serious environmental pollution and the high accident rate in the end of 90’s. After 2000, the required infrastructures have been improved significantly, being able to meet the conditions of environmental protection and to ensure the drivers working condition, as well as to meet the growing needs for land transportation. However, as the needs increasing, the exhaust gap emission has become a sensitive topic in 21 century (Sun & Wang, 2008). There is still a long way to go for China, and a long-lasting effort is still needed in order to build an urban transportation system that is dominated by green sustainable transportation.

Green transportation, in broad sense, refers to using low-pollution transportation options suitable for urban environments in order to meet social and economic needs. According to the research done by the National Academy of Sciences (2009), the CO2 emission of different transportation modes is presented:

![Figure 2-1 CO2 emission of different transportation modes](image)

It is obvious that rail transportation is the greenest transportation mode. The rail system in China has experienced similarly rapid expansion during the 10th Five-Year Period (2001–2005), China invested 200 billion Yuan ($31 billion) in urban rail construction, putting more than 400 kilometers into operation. These trends in China’s transportation sector suggest that the country’s green development strategy not only is compatible with economic growth, but can be a powerful economic driver. Indeed, the rest of the world will have trouble matching China’s tremendous investment in green transportation. The Chinese example only strengthens the economic case for a global green transition—and can help boost worldwide confidence about the benefits, including for developing countries.

According to the research done by National Academy of Sciences (2009), from 1998-2008,
most of the European countries had achieved total emission reduction, however the total CO2 emission in industrial transportation had increased 21%. The main reason is the fast development of road and air cargo transportation. Nowadays more and more countries pay attention to develop rail cargo transportation, so does China. For any green logistics, train is the core resource to offer efficient transport and logistics solutions (Sun & Wang, 2008).

The literatures regarding to the SSCM and green transportation can be referenced as the basis of data analysis, which may affect the CSR activity selection of CRCC. Reducing the environmental liability associated with the transportation processes is one of the crucial driver for CRCC to integrate more CSR activity. The environmental liabilities include pressure from social media and the public, the environmental damages, corporate social responsibilities and legislation obligations. The driver to apply green supply chain management system could be considered into the research background. It also gives some basic elements for the research to consider in research findings. The solutions need to be complied with environmental liabilities. The core of sustainable supply chain management is to meet the triple bottom line: to identify the activities which improve economic performance and dictate the avoidance of social and environmental activities which fall outside of this intersection, it can be reference as a criterion in CSR activity selection. Moreover, this research is focus on the transportation process, thus to have a basic understanding about the green transportation in china is necessary, such as the CO2 mission by different transportation modes, and the transportation mode selection.
2.2 CSR performance evaluation

The companies can measure the societal and business impact of CSR from various aspects.

**Measuring the business impact of CSR**

In terms of the business case for CSR, various researchers analyzed the relationship between CSR and its impact on the financial bottom line in theoretical (e.g. Schaltagger and Synastvedt, 2002; Steger, 2006)

CSR business benefits can be classified into monetary and non-monetary benefits. **Monetary benefits** in the understanding of this research include direct financial effects such as revenue increases and cost decreases. They also include benefits that do not directly lead to cash flows but can nevertheless be measured in monetary terms such as a reduction of CSR-induced risks or an increase in brand value. If analyzed from a financial perspective brand value reflects the financial value of a brand to a company (Gerpott and Thomas, 2004; Naderer, 2005).

**Non-monetary benefits** refer to benefits that are not directly measured in monetary terms but nevertheless influence company competitiveness and its financial success. They can be measured quantitatively.

Based on the actual situation of the company, both monetary and non-monetary benefits should be analyzed. **For non-monetary, it is not the financial performance, but the company’s CSR performance that can influence the cost or revenue, such as the cost can be reduced through lower energy consumption, or the revenue can be increased through thus this research only focuses on non-monetary benefits.**

**UN global compact**

The United Nations Global Compact is a United Nations initiative to encourage businesses worldwide to adopt sustainable and socially responsible policies, and to report on their implementation. The Global Compact asks companies to embrace universal principles and to partner with the United Nations. It has grown to become a critical platform for the UN to engage effectively with enlightened global business.

The UN Global Compact is a principle-based framework for businesses, stating ten principles in the areas of human rights, labor, the environment and anti-corruption. Under the Global Compact, companies are brought together with UN agencies, labor groups and civil society. The ten principles are mainly from 4 areas, Human Rights, Labor Standards, environment and anti-corruption.

**CRCC has officially became a member of UN global compact at March 2010, the company can responded to the ten principles in human rights, laborer rights, environmental protection and anti-corruption and sustainable development principle among enterprise, society and nature, and actively integrated them into the overall**
**Corporate strategy and operation.**

This thesis only focuses on the transportation process, thus in order to make the research more specific, this thesis only applies the global compact to the transportation process. The U.N. global compact management model will be used, it is an in-depth guide to help companies incorporate the Global Compact's 10 principles into the daily operations, as well as to work toward continuous improvement. It can be used to guide the company in CSR activity integration.

**Cranfield's model** is another model that can be used for evaluating the CSR performance of a company; it is a part from the book 'Cranfield on Corporate sustainability' which was published in 2012, edited by David Grayson & Nadine Exter. This model identifies five stages of maturity towards embedding corporate responsibility. At one end of the spectrum are companies that deny that they have any responsibility for their social, environmental and economic impacts. At the other are those where sustainability thinking has become ingrained in organizational culture and behaviors and they are a beacon of best practice – a champion – for other organizations to learn from:

Five stages of Corporate Responsibility Maturity

Stage 1 Denier
Stage 2 Complier
Stage 3 Risk-mitigator
Stage 4 Opportunity maximiser
Stage 5 Champion

Organizations are taking different approaches to sustainability, due in part to their stage of CSR maturity. 5 stages of corporate maturity can provide a clear view for CRCC of how is their current CSR performance in social, environmental and economic impacts, as well as which level that they want to achieve, it also can be seen as the desired situation of the company in CSR performance. The use of this model allows the company to evaluate the CSR performance logically, and to have a basic understanding of which aspects they need to pay attention to.
2.3 Traditional measures of the corporate performance evaluation

For traditional measures, company performance is a variable. The non-financial performance can be measured using operational **KPIs**, such as market share or customer satisfaction (Langfield-Smith, 1997). Tangen (2003) provides an overview of frequently used performance measures. Many researchers also use self reported measures to operationalize performance (Evens, 2006; Chaahall, 2001; Heni, 1999). Langfeld-Smith (1997) writes that the non-financial performance can be measured in various ways, but the performance can be hardly assessed without the link to corporate strategy. The consequence for the researcher is simple: it is first to decide what the research question should be, then a performance definition can be created. There are several models can be used for non-financial performance measurement:

**Gap analysis**

In the management literature, gap analysis is the comparison of actual performance with potential performance (Clicke, 2008), it is used for identifying the gap between the current situation and the desired future state, along with the tasks that needed to complete to close this gap. The process through which a company compares its actual performance to its expected performance to determine whether it is meeting expectations and using its resources effectively (Hyvönen, 2007). Gap Analysis is useful at the beginning of a project when developing a Business Case, there are mainly 3 steps in this tool:

1. listing of characteristic factors
2. listing factors needed to achieve future objectives
3. highlighting the gaps that exist and need to be filled.

Gap analysis can be helpful for this project, because it is necessary to have a clear view of the distance between current and desired situation then based on the actual requirements, the result of gap analysis can provide a foundation for protocoling the CSR activity implementation plan.

2.4 Stakeholder engagement

According to the seminal work done by Freeman (1984) who articulated a new conceptual model ‘stakeholder theory’ of the firm that must address the interests of its stakeholders – groups and individuals who can affect or are affected by the organization’s purpose. This “stakeholder model” pretends to extend managers’ attention beyond the traditional interest group of shareholders, towards employees, customers and suppliers and widely disparate groups such as local community organizations, environmentalists, consumer’s advocates, governments and so on.

The instrumental approach of stakeholder theory suggests that company can benefit financially from establishing positive relationships with stakeholders, they may support or oppose the decisions, be influential in the organization or within the
community in which it operates, hold relevant official positions or be affected in the long term. (Jones, 1990; Jones and Wiiks, 1999), which matches the objective of CRCC. Strengthened stakeholder relationships can become thus a significant source of competitive advantage in form of trust, reputation and innovation (Rodríguez et al., 2002).

Based on the 'Stakeholder theory' Stakeholder engagement is the process by which an organization involves people who may be affected by the decisions it makes or can influence the implementation of its decisions.

Stakeholder engagement is a key part of corporate social responsibility (CSR) and achieving the triple bottom line. Companies engage their stakeholders in dialogue to find out what social and environmental issues matter most to them about their performance in order to improve decision-making and accountability.

There are mainly 3 steps in the stakeholder engagement, the first step is:

1. **Map the stakeholders**
   Stakeholder mapping is a collaborative process of research, debate and discussion that draws from multiple perspectives to determine a key list of stakeholders across the entire stakeholder spectrum.

2. **Prepare for the engagement**
   - To determine the benefits company can expect from stakeholder engagement
   - To collect the information about stakeholder and their views.
   - SWANS & OWANS
   - To identify the organization’s priorities

3. **Engage stakeholders**
   In this step an action plan whose key aim is to translate the findings, insights, and agreements from the engagement into action and to communicate these actions to the stakeholders will be developed.

Stakeholder engagement is intended to help the practitioners fully realize the benefits of stakeholder engagement in the organization, to compete in an increasingly complex and ever-changing business environment, while at the same time bringing about systemic change towards sustainable development, it is a critical process that can help CRCC to understand their key environmental and social impacts and identify sustainability risks and opportunities.
2.5 successful CSR integration cases

This section reviews 2 successful CSR integration cases, those two cases are from different industry. DHL is in the same field with the case company; both of them are related with transportation, Toyota case is more supply chain oriented. The actions taken by those two companies in CSR integration can be referenced as the examples for CRCC. Both of these two cases are successful, thus it can be seen as the desired situation of CRCC in CSR performance.

2.5.1 CSR Incorporating the Global CSR strategy in Thailand

This explorative case-study investigation (Yin, 2003) will seek to highlight the key indicators of successful CSR strategy implementation (Lamberton, 2005). Therefor the company can reference those key points when formulating CSR implementation plan.

The approach of Deutsche Post DHL was to provide the framework towards their corporate responsibility strategy and allow each region and subsequently each country or territory to translate this to fit their local national and cultural needs: Go Help, Go Teach and Go Green,

Go Green
Go Green with its key focus on CO2 reduction has started to be implemented in a number of different ways within the company.

Transportation efficiency in services
With respect to bio-fuels, DHL Freight initiated a procurement change process, which ensured their truck fleet vendor would provide bio-fuel ready vehicles. Along with their biodiesel fuel supply contract agreement, and biodiesel ready vehicles, DHL (Thailand) have introduced driver training and operating procedures. They can also now monitor the efficiency use of their fleet using their GPS management system. From an internal performance measurement characteristic, this eco-efficiency measurement serves as one of the main KPI's (key performance indicators) for the transport director.

Warehouse and office efficiency
Alongside truck and transport fleet, examples of DHL (Thailand) activities on eco-efficiency assets center on both warehouse and office eco-efficiency initiatives. This is particularly relevant with respect to the nature of 24 hour, seven day a week warehouses and storage points usage and centers primarily on lighting projects, and to a lesser extent the air-conditioning and cooling requirements. At the office level, it centers on the IT-based contributions from office-based systems usage.

Warehouse lighting
Due to the high lux (lighting intensity requirements), warehouse lighting has long been identified as a potential source of energy efficiency, in terms of cost savings, as well
Paper use, reduce and recycle efficiency
The IT department has been active about integrating the corporate Centre’s desire to reduce paper use and increase recycled paper consumption.

Electronic documentation
In different departments and business units there have been examples around the adoption of e-documents. Some have benefits in purely the reduction of paper. Other paperless benefits emerge, with intranet use, due to additional advantages in terms of reduced journeys (thus fuel/CO2) and journey time for certain documents, as well as quicker, easier invoicing and billing management systems with clients.

Employee engagement
Along with employee engagement being generally recognised as an essential strategic component to nurture and establish for embedding CSR (Ferguson and Clerke, 2011), CSR has long recognised employee well being as a relevant performance metric factor and with respect to stakeholder theory and strategic stakeholder management.

Management styles
Scholars have already highlighted challenges in knowledge management from the centralised, autocratic and hierarchical management cultures in Thailand (high power distance) where low level employees are expected to comply and are not empowered or provided useful knowledge in order to make suggestions for improvements (Kaweevisultrakul and Chan, 2007). In contrast, the compliance approach with accepted CSR strategic activities, certainly in the beginning as a top-down approach, as a management culture appears to provide some advantages towards the quick implementation of new CSR policies, processes and behaviours within DHL (Thailand).

This explorative case-study can be referenced for CRCC when formulation the CSR integration plan, as a successful integration case, the CSR activities and strategy of DHL may be also suitable for CRCC. This case study can be used in investigate the desired situation of the company, DHL is a logistics company, it is also related with transportation.

2.5.2 case study – integrating CSR across value chain(Toyota Thailand)
Toyota Motor Thailand (TMT) Co., Ltd. has integrated CSR across their value chain throughout their network: suppliers, dealers and stakeholders. The responsibilities of TMT for environment, society and customers are integrated in every process from designing, purchasing, manufacturing, logistics, marketing, sales and after-sales
service; with the mindset that every member of Toyota value chain is the significant part to succeed in the practice of “Integrated CSR across Value Chain”

TMT is committed to make great contribution to Thai society through its Integrated-CSR practices across its value chain in 3 major modules:

**Green Purchasing & Manufacturing**
TMT only corporate with the companies which can meet international safety standards, without any form of forced or child labor, and use fair practice without prejudice and so on, as indicated in “Toyota Supplier CSR Guidelines”. TMT also carefully selects all materials and parts that do not use excessive energy or emit excessive gas that contribute to global warming in the production process. Moreover, TMT will select recyclable products whenever possible, as indicated in our “Green Purchasing Guidelines”.

In terms of manufacturing, in an effort to continually reduce CO2 emissions, TMT have adopted ISO 14001 guidelines and intend to use energy more efficiently, as well as expand into the use of alternative and renewable energy sources. In addition, TMT intends to produce as less waste as possible. Moreover, TMT also practice waste separation, and encourage recycling and reusing, and avoid buying products that are difficult to degrade.

**Responsible Management & Marketing**
TMT is committed to creating a good working condition in terms of safety and health. TMT will continue to provide fair compensation and welfare packages for their employees, as well as training courses for self-development and career growth at all levels. TMT also commits to promote ISO 14001 to their dealers, and transfer appropriate knowledge and technology to them and cooperate with them to service the customers at the best possible level. TMT further promise to maintain good quality and adequate quantities of spare parts for replacement at all times. TMT will respond quickly and effectively to defects, complaints, and inquiries, and will recall and recover any failures from our parts in a fashion satisfactory to the customers and the public.

**Contribution to Society & Community**
TMT uphold their responsibility to the stakeholders, as well as to the community in which they operate, as the highest priority. The company also commit to improving a better standard of living in the surrounding areas of the factory sites. Finally, the company promise always to conduct their business as a good-corporate-citizen. In addition, TMT pledge a percentage of their profits to social contribution projects so that they can consistently and continually be part of the driving force for Thai society development.

This case study is a very clear example of how to integrate CSR into value chain, the CSR activities and way of integration in this case can be referenced for CRCC.
also can conduct the CSR integration through several major modules; this case provides a straightforward example for CRCC in the way of integrating CSR activities into the raw material process.

2.6 Case study of lime transportation

Based on the characters of lime, there are some potential difficulties that the company needs to concern; especially the CSR activities that directly related with lime transportation, thus an article published by EPA (United States Environmental Protection Agency) is reviewed; it is regarding to lime transportation. Since limes are highly sensitive material to impact due to the relatively thin skins, they must be handled with appropriate care; the refrigeration temperature must always be maintained, even during cargo handling. Lime cargo is sensitive to dirt, fats and oils. The holds must accordingly be clean and in a thoroughly hygienic condition before loading, the employee in warehouse needs to double check in material handling, loading and unloading. The prevention mechanism has to be sufficient, because lime is a toxic material, If ventilation has been inadequate or has failed owing to a defect, life-threatening CO2 concentrations or O2 shortages may arise. Therefore, before anybody enters the hold, it must be ventilated and a gas measurement carried out. The TLV for CO2 concentration is 0.48 vol.%. The cargo is sensitive to dirt, fats and oils. The holds or containers must accordingly be clean and in a thoroughly hygienic condition before loading.

Lime is a sensitive material that requires accurate delivery, to review the literatures regarding to lime transportation can be helpful for investigating the suitable CSR activity that can avoid the damage during the transportation. Damage during the transportation can be a potential risk for CRCC, lime is a corrosive material, the damages during the transportation can give rise to safety threat for drivers or other staffs who work in the transportation process, as well as the environmental pollution, thus to lower the accident rate in transportation process is critical for CRCC.
2.7 Integrating CSR activities into business

Integrating corporate social responsibility (CSR) initiatives in a business is one of the great challenges facing firms today. Societal stakeholders require much more from the firm than pursuing profitability and growth. But these societal stakeholders often simply assume that increased societal expectations can easily be accommodated within efficiently run business operations, without much attention devoted to process issues. Based on Siggelkow's (2002)

2.7.1 Integrate CSR through the value chain

A value chain is a chain of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market. The concept comes from business management and was first described and popularized by Michael Porter in his 1985 best-seller, Competitive Advantage: Creating and Sustaining Superior Performance. A company can integrate CSR through the value chain by their support activities from different aspects; mainly form 4 aspects, firm infrastructure, human resource management, technology development and procurement.

The aspect of firm infrastructure includes:
- Financing
- Planning
- Strategy
- Investor relations

The aspect of human resource management includes:
- Recruiting
- Training
- Compensation system.

The aspect of technology development includes:
- Product design
- Testing, process design
- Material research
- Market research

The last one is procurement, which includes:
- Components
- Machinery
- Advertising and services

Managing sustainability issues at every stage of the lifecycle of the products, pay more attention about environmental protection as well as labor rights. Moreover the
company can work closely with the suppliers, to have a clear view about the reputation of the suppliers before collaboration; and to expand more channels of communication with suppliers, as well as the way of information sharing, evaluating and recognizing suppliers, it is a priority to help maintain high standards for ethics, labor rights, health and safety, and the environment (Wit and Van Gent 2001).

2.7.2 Product architecture assessment

The theme of this research to investigate the way of CSR activity integration in transportation process, in order to make integration, the transportation process should be redesigned. **Product architecture assessment** is a tool used to provide a framework to link product, process, and supply chain design decisions. The framework is aimed at giving advice regarding product design. It focuses on product architecture dimensions which are very important for operational strategy. The tool can help to assess the advantages and limitations of the current operational strategy along with the current product architectures. It can benefit with the way of creating dynamic capabilities.

- Dimension 1- Function-component allocation scheme.

A complete and well-structured product architecture assessment includes two different dimensions. The first dimension is **function-component allocation scheme**. The **product functions** can be divided based on differences in technical and marketing attributes. Functions can be divided into sub-functions. These sub-functions can be decomposed into lower level sub-functions (Pahl and Beitz, 1996). Since this framework is used to compare differences regarding product architectures, the functions that are in full or on the same level presented by different products. The functions should be chosen on the same hierarchy. The **product component** is also an important determination in product architecture assessment. Component is used to represent subsystems or modules. The exact meaning of component is decided by the second aspect: the chosen hierarchy level of the product.

Three steps of FCA

The function-component allocation (FCA) schemes can be decided and formed in three steps. The first step is building a matrix with product functions in the first column and with its components in the first row. It can be showed in binary. The component should be matched with the associated function. In other way, percentages or proportions of a function can be gathered to connect the relevant components. Due to different product items, functions, components and numbers of the product, the selection of the methods should be depended on actual circumstance.

The second step in designing FCA is calculating two indices for each function. The indices help to present how each function deviates from ideally modular situation. The
Ideally and perfectly modular situation can be represented by a 1-1 relationship for a function with a component. Deviations can be represented by 1-n, n-1 or n-n relationships. The first index clarifies the number of components which commonly offer a function. The second index assesses the extent to which these components associate with other functions. In third step, the two indices are used to locate each function on the function-component allocation map.

- **Dimension 2: Interface characteristics**
  The second dimension of product architecture assessment is interface characteristics. It measures the product’s different degree of being coupled, depending on the product life cycle phase. The interface can be measured based on three categories of information; the interfaces’ role for the product function, which is called ‘type’; role of making, changing and unmaking the product, which is called ‘reversibility’; roles regarding to substitutes, which is called ‘standardization’.

  **Interface type**
  It refers to the interface’s role for the product function. The types are decided by numbers and distributions over the product, the nature and intensity. The number of components is correlated to some extent. The distribution of the interfaces offers extra information regarding the product architecture. Compared with modular FCA scheme style, it is more possible for a product architecture with fragmented FCA scheme style to contains various components, which show interactions with more components. The nature of the interfaces refers to the physical effects which happen for the interface to work on its planned role. The intensity means its strength and desirability regarding its functional role. Sometimes it measures the degree of coupling.

  **Interface reversibility**
  The movement of different product changes throughout the product life, for example upgrade, add-ons, adaption or reuse very depends on the reversibility of the interface. The endeavor of reversing, disconnecting the interface can act as an agent to decide the reversibility of an interface. The endeavor relies on two elements: the dilemmas of physically disconnecting the interface; the position of interface in the entire product architecture. Measuring the reversibility can be done by assigning two values to each interface: the value which reflects the difficulty in interface disconnection; the value reflects the depth in which an interface is hidden.

  **Interface standardization**
  Interface standardization is related with component substitutes and product families. It is vital for product variety by component and interface standardization. A mapping tool which illustrates an interface from the perspectives of all components could be used to identify the role of interface regarding to component interchangeability. The level of standardization is not the same throughout the product architecture. The extent to which an interface can be evaluated with standardization from the perspective of each component is very crucial for assessing its role in a product family.
- Product Architecture Maps

Putting the function-component allocation data and the interface information together would fully complete the entire picture of product architecture. Therefore, gathering the information from all three interface dimensions and move it to the function-component allocation map would generate the product architecture map. The product architecture map could enable rapid visual references of similarities and differences during analyzing the product architecture.

The product architecture could help to coordinate decisions across product, process and supply chain. It could help to make the results of early decisions visible in value chain. The decisions regarding all steps could be referred. It integrates the understanding of literature knowledge, practical operations and supply chain management. In the case of CRCC, the company could consider to introduce the use of product architecture assessment as a tool to review its design decisions in its transportation process. It could help to identify the architectural characteristics which need to be emphasized during early transportation process redesign. The advantages and limitation of the redesigned transportation process can be clarified. It could help to improve the capabilities of operational strategies of CRCC. There will be architecture maps in Chapter Four. The creation of the architecture maps and framework is aimed to generate scenarios, opportunities and possible limits. The benefits of the redesigned transportation process can be figured out more comprehensively. Since it is very likely that some benefits may also create negative impacts, the architecture map would help to comprehensively evaluate the design decisions. The design decisions in transportation process will be listed in chapter four. The function-component allocation matrices will be made based on real situation of CRCC new transportation process. Interface matrices, product architecture maps will be made to elaborate more on both the old and the new transportation process architecture assessment. The similarities, differences, advantages and weaknesses of the two operational processes could be very clear to give a better understanding about the situation in CRCC. The assessment could help the company to create better solutions in changing period in the future.
2.7.4 three-dimensional concurrent engineering (3DCE)

Three-dimensional concurrent engineering (3DCE) is used to redesign the value chain, this model focuses on environmental impact, it is the simultaneous design of product, process and supply chain, it has been proposed as a way to improve traditional new product development outcomes. In the case of CRCC, the research objective is not related with manufacture, the new product can be a updated value chain. Redesign the current transportation process can appear to be a lesser concern associated with the environmental impacts

When develop new product, it can be seen as a platform for marrying new product development (NPD) and environmentally responsible manufacturing (ERM). 3DCE presents a platform for ERM to be more integrated into mainstream, new product development (NPD) efforts.

By incorporating ERM goals at every step of the way in 3DCE, organizations should be able to enjoy all of the benefits of traditional NPD and ERM. The NPD–ERM framework based on 3DCE suggests that studies examining the alignment of product, process, and supply chain are needed to improve outcomes and to expand the body of knowledge in the area of ERM.

![Figure 2-1 3D Engineering – integrating NPD and ERM](image)

The framework in Figure 2-1 provides a listing of the particular activities of concern in the areas of product, process and supply chain for ERM. It also notes the activities that are at the intersection of two areas. A true 3DCE perspective on NPD–ERM would embrace the simultaneous development and integration of some activities in each area of product, process and supply chain or their overlaps.

The three elements mentioned in Figure 2-1 are:

- **Product design**
  - In ERM, product design Focus on the use of environmentally friendly materials, use and combine fewer materials. Safety, reduced cost, more consistent quality, and increased
scrap value are other priorities of ERM product design. In traditional NPD, product design concerns with product specifications, performance, quality, and materials.

**Process design**

Process-related ERM initiatives include a focus on processes that reduce the source of waste. Porter and van der Linde(2006) also point out that a sustainable process focus may result in improved process consistency, reduced downtime, and lower costs. Recyclable products can lower the user’s disposal costs and lead to designs that allow companies to more readily recover valuable materials. NPD links operations strategy to business strategy which focuses on methods that will be used to manufacture the product: equipment requirements, plant layout, and process flow.

**Supply chain design**

ERM focuses on the impact of the firm’s activities outside of the firm’s boundaries. Include planning for the reverse flow of goods and other and environmental considerations. Moreover, it may also include environmental supplier evaluation and selection and customer/stakeholder environmental concerns. NPD spans organization boundaries to include customer and supplier needs and capabilities. Focus on in-source versus out-source decisions.

Based on the actual situation of the company, currently the traditional goals and environmental goals are managed separately in CRCC, when conduct new product development it creates redundancy and waste in the system. 3DCE is a suitable tool to make new product development, the new product development for this thesis project can be redesign the transportation process, it is related with product architecture assessment.
2.8 PDCA Cycle

Sustainable development requirements are integrated into the key business planning processes for the company: New Country Entry, Sustainable Development Action Plans, the Long Range Plan, Project Development Authorization and Management System and the Health Safety and Environment Management System.

PDCA cycle is used to make the specific CSR activity implementation plan. It is an unstopped continuous improvement tool, from plan to act, it creates a complete system of continuous improvement for CSR integration, exploration, projects and assets at all stages of lifecycle, and it will be used.

PDCA was made popular by Dr W. Edwards Deming, who is considered by many to be the father of modern quality control; however, he always referred to it as the "Shewhart cycle". There are mainly 4 steps within the model, In the first step (plan), a way to effect improvement is developed. In the second step (do), the plan is carried out, preferably on a small scale. In the third step (check), a study takes place between what was predicted and what was observed in the previous step. In the last step (act), action is taken on the causal system to effect the desired change. The activities of each step are listed in the chart, the whole process begins from the first step plan, then the second step do, third step check and the last step action.

The PDCA cycle is a straightforward tool for the company to formulate and conduct the CSR activities implementation plan. PDCA cycle is a clear and simple tool for every reader, and easy to understand. Based on the actual situation of the company, more details are added in each step, the specific details are presented in chapter 4, because it is a continuous cycle, thus the company can keep making adjustments based on their actual actions, as well as the feedbacks from various stakeholders, then to make the implementation process smoothly. Because this thesis only focuses on the "plan" part, rest parts in this model are not concerned many details.
2.9 Project challenges

This thesis project may face the challenges in implementation, in order to prevent the potential difficulties, the literatures regarding to challenges of CSR integration are reviewed.

To adopt a balanced approach in CSR integration, companies should consider introducing the following actions into the management systems:

- Defining the mission and values of the company
- Identifying key stakeholders
- Defining responsibilities towards stakeholders (code of ethics)
- Engaging with various stakeholders
- Analyzing social, ethical and environmental risks
- Introducing awareness-raising ethics training
- Communicating with employees
- Designing an ethics infrastructure (policies and standards of conduct)
- Monitoring the compliance with this infrastructure
- Publishing a report (accountability)
- Seeking assurance (internal and external)
- Reviewing the process
- Learning and innovating
2.10 Chapter summary

This chapter contains 5 main concepts, and each of the concepts contains several literatures and models; the whole chapter of literature review can provide a theoretical foundation for answering the research questions. The theory selection is based on problem definition and research questions. Moreover, there are more than 3 literatures used for supporting each theory, these resources set up a theoretical foundation for future analysis.
CHAPTER 3 METHODOLOGY

This chapter presents how the research was conducted and what needed to be done in order to collect the data. It also explains the chosen research strategy and the measurements that were taken in order to achieve creditable results.

3.1 Purpose of the research

The aim of this research is to investigate possible CSR integration plan for the domestic raw material transportation process in CRCC. In order to do this, it is important to get an understanding of the company’s current CSR performance in transportation process. When this is achieved, the desired situation of the company’s CSR performance is discussed and linked to the current performance, linking these two scenarios enables the company and researcher to determine the potential CSR activities that suitable for the transportation process and can help the company achieving their objectives.

3.2 Problem Definition

CRCC wants to integrate CSR activities into the domestic raw material transportation process in order to meet the stakeholders’ expectation and to benefit the company in long term.

However the company has not got a clear plan about what kind of CSR activities can be integrated and how to integrate the CSR activities into the domestic transportation process, as well as the potential difficulties in implementation.

Based on the advices provided by the management team of the CRCC, in order to investigate the suitable CSR activities that fit for the raw material transportation process; the problem within the current transportation process should be analysed first, it is the basis for whole research. Then the desired situation should be investigated, in order to have a clear view of what kind of CSR activities that the suitable for the company to fill in the gap between the current performance and desired situation. After that the possible implementation plan can be done. During the implementation, potential difficulties might exist, thus those difficulties also should be taken into consideration.

There are 4 main drivers that affect CRCC to conduct this CSR project. Those elements are also the key issues within the current transportation process; those factors can be seen as the root causes or drivers that influence CSR activity integration.
The first factor is the expectations from stakeholder. Stakeholder plays an important role in any business. Stakeholders also can affect or be affected by the actions of a business as a whole. There are 3 sub elements within this factor. The first one is the requirement from various stakeholder groups; different stakeholder groups have different requirements. (For example, the workers in warehouse would like to have a safer working condition) Those requirements can be identified through interviews. CRCC needs to fulfill the needs from the stakeholders. The followed is the expectation from stakeholder. As the development of modern business, people care more about Corporate Social Responsibility. The stakeholders would like to see a better performance of the company in this field. Thus meeting the expectation of various stakeholders can also help CRCC to increase the stakeholder satisfaction rate. Currently, the satisfaction rate of CRCC in CSR performance is acceptable, but the management team wants to improve the satisfaction rate to a higher level, to be the market leader in CSR performance.

The second factor is internal factor (from the CRCC itself), which means the factors that from inside of the company, including working condition, operational effectiveness and brand value. Currently the working condition still can be improved, such as the dust in unloading and unloading lime, employee wants to have safe and health working environment, so does the client, as well as other stakeholders, a good working condition not only can improve the productivity, but also can benefit the company in long term development (such as less accident rate, higher employee satisfaction rate). By integrating CSR activity the operational effectiveness in the transportation process also can be improved. Now, delay is not a big problem in transportation process, but the operational effectiveness still can be improved. Highly effectiveness is always good for transportation process. Many activities can be referenced, such as updating the training program, letting the employee increase their safety awareness, and improving driver shift working system in order to avoid fatigue driving. More advices will be collected through interviews. An appropriate integration of CSR activity can help the company to improve their brand value. CSR is not only a market trend, but also a tag for a company. If a company is doing well in the field of CSR, it is also can be a powerful propaganda.

The third factor is external factor, which includes market trend, the pressure from government and public. Recent years, CSR has become a popular slogan for many international enterprises; it is the current market trend. CRCC is also influenced by this market trend. As one of the biggest enterprise in China, the company has to make positive achievements in the field of CSR. Then is the pressure from government and public. Recent years, the Chinese government cares more about supporting CSR activity. The new Chinese company law (2006) also concerns the articles regarding to CSR. As a state owned enterprise, CRCC has to be the market leader in the field of CSR. Moreover, the pressure from public can also influence the company, such as NGOs and other social institutions. Those institutions also push big companies like CRCC to participate in CSR activity.
The last factor is the **characters of raw material**. Lime is a highly corrosive material. So the transportation safety and the safety in material handling should be taken into consideration. The company should take some measures to improve the transportation safety. Another problem regarding to the characters of raw material is the dust in loading and unloading lime. It is the biggest problem of raw material in transportation process. It is impossible to avoid dust in loading and unloading lime. The company can only take some measures to lower the impact of the dust in loading and unloading lime, such as the new storage facilities in the warehouse.

### 3.2 Research design

This research is a practice oriented research, which contains problem-analysing and evaluation research. Practice research is a form of academic research which incorporates an element of practice in the methodology or research output.

#### 3.2.1 Research strategy

The exploratory study has been used to develop understanding and identify the potential CSR activities that fit for the current domestic raw material transportation process. Exploratory research helped to determine the most suitable research design and data collection method. The focus was on gaining insights and familiarity for later investigation or undertaken when problems were in a preliminary stage of investigation (Freeman, 2001). As an exploratory research, this research mainly relied on secondary research such as reviewing available literatures and data, using qualitative approaches as primary data, such as informal discussions with consumers, employees, management team, and formal approaches through in-depth interviews, focus groups, projective methods, case studies and pilot studies.

#### 3.2.2 Research steps

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<thead>
<tr>
<th>Steps</th>
<th>Research Methods</th>
<th>Objective</th>
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<tbody>
<tr>
<td>Define the problem</td>
<td>Communicate with the management team of CRCC through in-depth interview, as well as daily observation and case study (such as review the pervious CSR report).</td>
<td>To determine and analysis the existing problems regarding to CSR in the transportation process of CRCC, as well as the barriers to proceed this research.</td>
</tr>
<tr>
<td>Thesis objective</td>
<td>Based on the problem definition, and discussion with management team.</td>
<td>To get a right direction for the thesis writing</td>
</tr>
<tr>
<td>Define the preliminary problem</td>
<td>In-depth interview with participators within the transportation process, daily observation as well as supervisors.</td>
<td>To describe the problem and link the results questions to the problem</td>
</tr>
<tr>
<td>Construct preliminary</td>
<td>Case study, daily observation, communication.</td>
<td>To define the main research question and sub questions, the questions are</td>
</tr>
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</table>
3.2.3 Rationalization of the research questions and objectives

This table is made based on the research process; the answers from sub question 123 are the basis for answering the main research question. The main research only can be answered after having a clear view of the sub question 123, thus the main research is in the fourth position of this table.

<table>
<thead>
<tr>
<th>No</th>
<th>Research questions</th>
<th>Research objectives</th>
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<tr>
<td>1</td>
<td><strong>What is the current performance of the company in domestic raw material</strong> <strong>transportation process regarding to CSR?</strong>&lt;br&gt;  • What are the characteristics of the raw material?&lt;br&gt;  • How does the current transportation process work?&lt;br&gt;  • What are the responsible departments for each step?&lt;br&gt;  • What are the problems within the current transportation process?&lt;br&gt;  • What are the current CSR activities in the transportation process?</td>
<td>To get an overview of the current transportation process; it is the basis of whole research.&lt;br&gt;  ✓ The characters of raw material, and the requirements in transportation&lt;br&gt;  ✓ The specific steps within the process&lt;br&gt;  ✓ The CSR activities within each step&lt;br&gt;  ✓ The responsible department for each step&lt;br&gt;  ✓ To investigate the problems within the transportation process,</td>
</tr>
<tr>
<td>2</td>
<td><strong>What is the desired situation of the company in domestic raw material transportation process regarding to CSR performance?</strong>&lt;br&gt;  • Who are the stakeholders?</td>
<td>To identify the idealized situation of the company in CSR performance&lt;br&gt;  ✓ Form the aspect of various stakeholder groups</td>
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<tr>
<td>Table 3-3 Rationalization of the research questions and objectives</td>
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<tr>
<td><strong>3</strong> What CSR activities can be integrated into the domestic raw material transportation process of CRCC?</td>
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<tr>
<td>- What are the gaps between the current and desired situation of the company's CSR performance?</td>
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<tr>
<td>- What improvements can be made to fill in those gaps?</td>
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<tr>
<td>- What are the potential CSR activities in different aspects (such as from management level, employee or environmental protection) that may suitable for the current transportation process?</td>
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<tr>
<td>To investigate the possible CSR activities can be used in the transportation process, in order to help the company to achieve the desired situation, as well as meet the expectation of various stakeholder groups.</td>
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<tr>
<td><strong>4</strong> Main research question: How to integrate those new CSR activities into the raw material process of CRCC?</td>
<td></td>
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<tr>
<td>- What is the action plan of the implementation plan?</td>
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<tr>
<td>- How to conduct the implementation in short term mid-term and long term?</td>
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<tr>
<td>- What are the costs for implementation?</td>
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<tr>
<td>- How to make the future improvements after the implementation?</td>
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<tr>
<td>- How to monitor of guarantee the implementation?</td>
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<tr>
<td>To draft the implementation plan for the CSR activities that determined in 3rd sub question. The whole implementation plan should include the cost for implementation, and it can be divided into 3 periods, short, mid and long term. To recommend the solutions for monitoring the implementation, as well as making future improvements</td>
<td></td>
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<tr>
<td><strong>5</strong> What are the potential difficulties in implementation? How to control and avoid those difficulties?</td>
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<tr>
<td>- What are the common difficulties in CSR plan implementation?</td>
<td></td>
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<tr>
<td>- What are the potential difficulties from the different aspects? such as from the aspect of various stakeholders</td>
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<tr>
<td>To identify the difficulties in implementation</td>
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<tr>
<td>To recommend on the most suitable solutions to control those difficulties, in order to successfully conduct the implementation plan</td>
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</tbody>
</table>

3.3 Research method

The qualitative research can better fit the research project as it could help to directly
obtain the detail information regarding the research problems by talking and interacting directly with participants.

Qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. It uses very different methods of collecting information, mainly individual in-depth interviews and focus groups. The nature of this type of research is exploratory and open-ended. In this research, small numbers of people were interviewed in-depth and a relatively small number of focus groups were conducted, which was suitable for this research to obtain data. Participants were asked to respond to general questions. The interviewer or group moderator probes and explores their responses to identify and define people’s perceptions, opinions and feelings about the topic or idea being discussed, and to determine the degree of agreement that exists in the group. The quality of the finding from qualitative research directly depended upon the skills, experience and sensitive of the interviewers or group moderators.

This type of research is often less costly than surveys and is extremely effective in acquiring information about people’s communications needs and their responses to as well as views about specific communications.

The aim of qualitative research is to describe certain aspects of a phenomenon, with a view to explaining the subject if study (Cormack, 1991). Qualitative research involves an interpretive, naturalist approach to this project, which means to study things in natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. (Denzin & Lincolin, 2005)

In order to have a clear view of how to integrate CSR activities into the domestics transportation process of CRCC, qualitative research could be the best fit for this project.

3.4 Data collection method

The exploratory study has been used to develop understanding and identify the potential improvements contain in the current transportation process of CRCC. This research was a qualitative research; which contained document analysis, case study, interviews, daily observations and literature review. All the data were checked in the early stage of initial analysis, through daily observation and the feedback from management people.

Primary data

For this project, the primary data of this research were collected through interviews and daily observation, as well as the document and report. After the data collection, all of the data were reviewed and organized into categories that cut across all of the data sources. Those data could present the different perspectives of the main issue.

Interviews were conducted with employees, team leaders of CRCC, experts and
consultants from external organizations. Interviews were particularly useful for getting the story behind a participant’s experiences. The type of interview is **in-depth interviews**, which is qualitative interviewing. The reasons of choosing this kind of data collection method are: it could enhance the accuracy and detail information gathered. It was also easier to find information because of the immediate response; in-depth interview also had high flexibility of questioning, and high ability in asking complex questions. Moreover, to gather qualitative data, that would be vital to the data analysis. The interviewer could pursue in-depth information around the topic. Interviews might be useful as follow-up to certain respondents to questionnaires, e.g., to further investigate their responses (McNamara, 1999). The participant observations were done within the company to see its daily operation and explore the relevant critical factors. Through the observation, the causal relationships between several factors on the one hand, which affect the decision on the other, were defined. The strategies of how to choose appropriate people to interview were elaborated in the next section.

**Sampling Strategies for Interview**

Sampling strategies were elaborated to show the decision making process of how to choose the appropriate people to do interviews and observations. In general, judgemental sampling, to be specific, purposive sampling was used as the main sampling method. Sampling was done based on certain criteria.

- 20 semi-structured interviews were conducted in total, audiotape has been used, and all the interviews were transcribed. Semi-structured interviews are relatively flexible compared with structured interviews; it allows new ideas to come into the interview, the interview questions can be changed a little bit to fit the specific interview context. Thus the results of the semi-structured interviews could be more applicable for this research.
- Face-to-face was the best choice of doing interview. Email correspondence and telephone were the backup choices.
- The scale of sample size of interview was based on the actual situation, the number of people in logistics department of CRCC and external organizations regarding the research questions. Due to the scale of this research, all the interviewees were representatives of people who were most directly and closely related with the topic.
- Voice recorder was used to record the interview. Email or electronic message, phone text messages were also used to record the information from interviewees.
- Since the interviews were done in Chinese, it could help to reduce the obstacles and misunderstandings in collecting information.
- 5 Workers/Employees in the logistics department of CRCC in Beijing.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Reason for choosing the interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 workers from warehouse department</td>
<td>Direct participant in transportation process</td>
</tr>
<tr>
<td>5 workers from transportation department</td>
<td>Direct participator in transportation process</td>
</tr>
<tr>
<td>2 directors in the logistics department of CRCC (in headquarter)</td>
<td>People from management level may have different views about the transportation process than the direct participators</td>
</tr>
<tr>
<td>4 domestics project managers</td>
<td>The transportation process is the main part in project supply chain, thus the project managers also should be interviewed</td>
</tr>
<tr>
<td>2 customer ( a representative from Nanjing municipal government)</td>
<td>Customer always evaluate things from different perspectives compare with the direct participators</td>
</tr>
<tr>
<td>2 responsible person from the raw material production place</td>
<td>Production place is the beginning of whole transportation process</td>
</tr>
</tbody>
</table>

These interviews were proceed to obtain the information of the flaws regarding to CSR in current raw material transportation process, also the possible causes as well as the suggestions from the opinion of the participants. Each interview took about half an hour. 25 questions were answered by the interviewees. Reliability of the interview were verified by other employees, in order to get reliable data.

**Observation** was mainly focused on how the participants conducted their work in the domestic transportation process. The triggers that make CRSS wants to integrate CSR strategy into the process, as a participator within the process, would be a participant observation. Moreover it was also aimed to find the shortage in personnel and operational perspective within process. In order to lay a foundation for future improvements, through daily observation and working experience the data obtained were analysed deeply.

The thesis internship period was 3 months; it was a full-time internship, 5 working days per week. In order to obtain enough information for this thesis project, the internship was done in two cities, 1 month in the project of Yangtze River tunnel (Nanjing) and two months in the logistics department of CRCC (Beijing). The works in domestic project were more practice oriented; the works in logistics department in headquarter were more administrative.

The first internship was in Yangtze River tunnel. One of the biggest lime production place owned by CRCC was near the site of Yangze River tunnel project, thus field study in lime production place was conducted as well. As it mentioned in the chapter of introduction, each domestics project owns their own transportation process, through participating in the real transportation process, a better understanding
regarding to communication process, working process, information flow as well as the actual transportation process can be obtained, the data collected in this period was “details oriented”. Because the works in logistics department of CRCC were more administrative, thus how the transportation process works from the viewpoint of management team was obtained, the data collected in the second period was taken the transportation process as “whole”.

In order to keep a record of the data obtained from daily observation, working diary was written (Appendix B). The minutes were recorded during the meeting in both domestics project and logistics department in CRCC. Moreover, the emails sent and received during the internship were all saved.

As a participant, document and report were not hard to obtain. CRCC have published their CSR report since 2010, there were also some previous documents regarding to the domestics transportation process. Through reviewing the previous documents and reports, the best CSR strategies that fit the current domestic transportation process could found.

**Primary Data**

<table>
<thead>
<tr>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSR performance of the company in within the transportation process</td>
</tr>
<tr>
<td>How does the transportation process work</td>
</tr>
<tr>
<td>Potential improvements</td>
</tr>
</tbody>
</table>

**Secondary data**

Secondary data is the data that collected by someone other than the user, and common sources of secondary data for social science include organisational records and data collected through qualitative methodologies or qualitative research (ketan 1993). The source of the secondary data for this research was case study and literature review;

**Case study**

Robson(2002) defines case study as ‘a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple source of evidence. The case study strategy has the ability to generate answers to questions such as: “why, what, how” (Saunders, Lewis, Torn hill 2007, 138-140).
This research strategy was concerned with two dimensions. The first dimension focused on the current CSR performance of the company in transportation process. For this dimension, the internal documents were reviewed, such as annual CSR report as well as the working diary form participators within the transportation process. The other dimension was the successful CSR integration cases form other company, it could provide suggestions for CRCC in their own integration project. Another part of secondary data was literature review, various books and journals which contain related theory and models were reviewed. The secondary data could also be helpful in the research design of subsequent primary research and could provide a baseline with which the collected primary data results could be compared. Therefore, it is always wise to begin any research activity with a review of the secondary data.

Figure 3 – 4 Secondary data

Research questions and the data collection methods for each question:

<table>
<thead>
<tr>
<th>Research questions:</th>
<th>Data collection methods</th>
</tr>
</thead>
</table>
| What is the current performance of the company in domestic raw material transportation process regarding to CSR? | - In-depth interview    
- Observation    
- Case study (annual CSR report, working dairy form participators within the process)    
- Literature review (performance evaluation, process management and CSR concepts) |
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Data Collection Methods</th>
</tr>
</thead>
</table>
| What is the desired situation of the company in domestic raw material transportation process regarding to CSR? | • In-depth interview  
• Observation  
• Case study (suggestions collected from previous satisfaction survey)  
• Literature review (CSR concepts and stakeholder engagement) |
| What CSR activities can be integrated into the domestic raw material transportation process of CRCC? | • In-depth interview  
• Observation  
• Case study (successful CSR integration cases from other company)  
• Literature (CSR concepts) |
| How to integrate CSR strategy into the transportation process in order to solve those problems? | • Literature review (all aspects), Observation  
• In-depth interview |
| What are the potential difficulties in implementation? How to control and avoid those difficulties? | • Literature review  
• In-depth interview |

Figure 3-5 Research questions and the data collection methods for each question:

**Data analysis**
The primary data and secondary data were analysed through the use of template analysis. Template analysis is a structured technique for analysing qualitative data that enables researchers to place some order on their data from the start of the analytic process. The key advantage of the technique therefore is that through its application, researchers have a relatively clear path to follow in creating a structure for the analysis of the data; it can reduce large amounts of unstructured text to that which is relevant and manageable in for the evaluation. Sections of the text are described and organised according to themes considered to be important to the evaluation. Unlike the quantitative approach of content analysis, developing the codes is part of the analysis process and these codes emerge from the data rather than being fixed at the outset. These codes are the ‘template’. The coding structure tends to be hierarchical with sub-themes emerging within themes. The coding enables more efficient sorting and retrieval of data according to these themes, particularly if appropriate software is used to aid this process.
Analysis templates can be found in appendix A, interview summary and transcript and Appendix B, working dairy summary.
3.5 Quality criteria

The main indicators of the quality criteria:
- **Credibility/Validity:**
  It refers to confidence in the truth of data and interpretations of them. Data and information regarding to literature will be obtained from official publishers. By resourcing from Chinese official information portal, the credibility and accuracy of the information could be ensured. Data and information about company profile and daily operation procedures were referred from company documents and interviews with employees within CRCC.

- **Transferability/Generalizability**
  Transferability, analogous to generalizability, refers to the extent to which qualitative findings can be transferred to other settings or groups. The result of this research also can be applied in the similar situation as CRCC. Because of the current trend, other companies may also deal with the similar situation as CRCC. Thus the findings can be transferred to other settings or groups.

- **Dependability/Reliability**
  It refers to the stability of data over time and over conditions. Credibility cannot be attained in the absence of dependability. In order to obtain dependability data, professional journals, academic articles from international institution were reviewed to ensure the reliability of the data. The selection of the journals and academic articles was very strict to make sure that the literature was totally from a professional perspective. The validity and reliability of the results were influenced when the data and information were referred and interpreted segmentally without overall previewing.

- **Confirmability/Objectivity**
  Confirmability refers to objectivity, the potential for congruence between two or more independent people about the data’s accuracy, relevance. The data collected were assessed and to make sure that there were more than 2 people supporting a same result.

3. 6 Chapter summary

This chapter presents the key components of the research methodology.
- Research goal and questions
- Explain research strategies and data collection methods
- Measures to ensure the reliability of the research is introduced.
- Planning and execution of the research and project risks analysis.

The issues regarding to validity and reliability of the research results need to be concerned during data collection and analysis. Based on reliable resources which have determined in previous stages, the validity of collected data could be guarantee.
CHAPTER 4 RESEARCH FINDINGS

This chapter presents the found results through answering into the research questions. The theoretical concepts from literatures will be used to analysis the findings.

In the beginning of this chapter, the case study of CRCC is conducted. Firstly the general information regarding to the company is introduced. After that is the case background, the CSR in China and logistics are presented. The research object of this thesis is the transportation process, thus how does the current transportation process work is discussed after the case background.

The next section in this chapter is CSR evaluation. The CSR performance of CRCC in transportation process is analysed through the use of various models. Firstly the non-monetary performance and monetary performance are presented. Then by the use of corporate maturity, this model can make the CSR performance evaluation quantifiable.

The following section is the desired situation of CRCC in CSR performance. In the beginning of this section, two case studies are conducted; by reviewing the successful cases of CSR integration, the possible CSR activity may suitable for CRCC can be discovered. The data collected through interview regarding to the desired situation is presented after the case study.

The key section of this thesis research is “CSR integration”. This section contains two parts. The first part is CSR activity implementation plan, it focuses on the specific implementation plan, with high emphasize on the details. Based on the previous analysed and the data collected through interview, the possible CSR activities can be applied in new transportation process are determined. Then through the use of PDCA cycle the CSR activity implementation plan can be formulated. The other part is transportation process redesign, it focuses on the whole process, with high emphasize on whole. After adding those new CSR activities into the current transportation process, the transportation process is updated, then by the use of supply chain architecture assessment, the comparison between current and new transportation process can be done, this model is the most suitable tool to assess the supply chain architectures, the advices for supply chain redesign can be obtained after the assessment, it is the basis for applying 3D-CE. 3D-CE is the last model used in this section, the new CSR strategy in transportation process can be determined through the use of this model.

The last section in this chapter is the difficulties in implementation, as well as the possible solutions for avoiding difficulties; the data used in answering this question are collected through case study and interview.
4.1 Case study: CRCC

This section presents the general information regarding to the case company China railway Construction Corporation limited, the organization characteristics of CRCC is going to be described.

4.1.1 Company profile

China Railway construction limited was founded in 1948, it is a state – own enterprise that dedicated in engineering contracting, survey & design consultation, industrial manufacturing, real estate development, capital operation, mineral development, and logistics and material trade. In March 2008, CRCC was listed on Shanghai Stock Exchange and Stock Exchange of Hong Kong separately.

The company administrated 32 wholly-owned subsidiaries; this thesis is going to focuses on the transportation process in domestic projects that operated by those subseries. Currently, the business (also the subsidiaries) of the company covers 31 domestic provinces, municipalities and autonomous regions as well as Hong Kong SAR, Macao SAR and more than 45 countries in the world.

4.1.2 Case background

Firstly the case background is going to be introduced. It is the basis of the whole research. Having a clear view of the background information from various aspects can be helpful for conducting further research.

CSR in China

The concept of CSR was introduced to China at the end of 20’s. However, only after China’s joining WTO in 2001, CSR was taken seriously in China due to the severe situation of social irresponsible behavior of business in China and the criticism from overseas. Under the huge pressure form government and public, many companies begin to assume their social responsibilities, such as philanthropic donation, pollution control, and energy saving, etc.

Caring more about corporate social responsibility is the current trend in sustainable development, there are several drivers can influence the Chinese government and public in paying attention to CSR. Those effective drivers for CSR in China can be classified into 5 categories, including Natural Drivers, Labor Drivers, legal driver, market driver and political drivers.

Nature driver is mainly focused on environmental protection; labor drivers with high emphasis on labor rights protection. The new PRC Company Law, which took effect from 1 January 2006, mentioned that a company shall accept social responsibility, not only comply with the laws and administrative regulations but also observe social morality and business ethics. For market drivers, exports and sales to foreign markets are a key driver for improving CSR performance in China. The last one is political
drivers. ‘The Construction of a Harmonious Society’ is the primary political drivers for developing CSR in China, being the central policy guidelines for sustainable development and overall societal balance in China.

**CSR in logistics in China**

Since 90's, people have started caring about sustainable supply chain management, the development cargo transportation in China has received an unprecedented focus. The supervision of cargo transportation in 90’s was inattentive. It caused serious environmental pollution and the high accident rate in the end of 90’s. After 2000, the required infrastructures have been improved significantly, being able to meet the conditions of environmental protection and to ensure the drivers working condition, as well as to meet the growing needs for land transportation. However, as the needs increase, the exhaust gap emission has become a sensitive topic in 21 century (Sun & Wang, 2008). There is still a long way to go for China, and a long-lasting effort is still needed in order to build an urban transportation system that is dominated by green sustainable transportation.

**4.1.3 Current transportation process**

This section presents how the current transportation works, before the investigation of whole transportation process, it is necessary to have a rough idea about which raw material is going to be transported. As it mentioned in the beginning of this thesis, lime is the only raw material that this research going to focus.

There are two kinds of limes, quicklime and hydrated lime. Hydrated lime can be produced by the reaction between quicklime and water. This reaction is commonly known as lime slaking or hydration.

Quicklime can be shipped via in barges, railcar, bulk truck, sea containers, bulk bags and paper bags. The most common delivery is in 25 Te bulk trucks. Hydrated lime is available in bulk trucks, bulk bags, and paper sacks.

This research mainly focuses on the transportation of quicklime.

**Way of quick lime transportation:**

Both rail and road transport are the normal way of lime transportation, based on the actual situation of the company, as well as the advices from management team, road transport will be the main research objective, as rail transportation is relatively environmentally friendly. Moreover, the main steps of these two within the transportation process are almost same.

Lime can be shipped in a variety of containers. Based on the recommendation of the company, this research is only going to focus on bulk deliveries, bulk deliveries are either in railcars, the load capacity of railcar is 100 tons, or in self-unloading bulk
trailers. The load capacity of bulk trailer is 20-25 tons. Rail cars are either the hopper type, which unload by dumping by gravity to a storage pit (Figure 4-1) or unloading device or a PD car, which is unloaded by pneumatic transfer. Truck trailers are usually equipped with a pneumatic unload system which will unload 15 - 20 TPH through a 4” line using up to 600-1100 cfm of convey air.

Graph 4-1 Railcars unload

Graph 4-2 Truck delivery

**Basic information about the transportation process**

![Diagram of transportation process](image)

As it shown in the figure 4-3, there are mainly 7 steps in the raw material transportation process and two departments responsible for the lime transportation process, warehousing department and transportation department. Warehousing department is responsible for step 1 - 3 (marked with underline), transportation department is responsible for step 4 – 7 (marked in boldface). The specific steps and the responsible department for each step will be introduced in next section.

**Division of two departments in transportation process**

In order to lay a foundation for future research, the transportation process will be analyzed specifically in this section, firstly from the perspective of different department.
TRANSPORTATION PROCESS

As it shown in Figure 4–4, there are mainly two departments in the raw material production base, that responsible for the whole transportation process. Warehousing department takes charge from receiving processed raw material after the quick lime processed. For this step quality inspector checks the quality of quick lime, which is the last check before the raw material arrives at construction site. The next step is in stock management, the inventory controller is responsible for it. And their duty is to record and manage the changes in inventory. Then followed shipment scheduling, dispatcher is responsible for this step. Their work is to contact transportation department for arranging the pick-up and transportation. All the information is recorded in the information center; it plays a role like coordinator to link different departments. In order to make the whole process works smoothly, information coordinator in charge of the activities in this step. Then is cargo loading, transportation department is responsible for this step. Because of the character of quick lime, the dust in cargo loading and

Key quotes form interview:
All of the 10 direct participators (workers in warehouse and transportation department from Yangtze River tunnel project) indicated there are 7 main steps within the current transportation process. The division of whole process is clear; the current transportation process can work smoothly, and ready for CSR integration.
The 2 directors from logistics department of CRCC indicated that “the transportation process in domestics project are almost same, thus the research findings also valuable for rest domestics project, lime is the most common raw material, thus you can only investigate the lime transportation process”
unloading should be taking into consideration. The next one is in transportation and the last step is cargo unloading.

**Key performance indicator for transportation performance:**
The KPI for transportation performance including on-time deliveries, demurrage cost percentage, damage, missed appointments percentage, freight bill accuracy, cost per order, delivery accuracy.

Based on the current situation of the company, the on-time delivery is not a big problem. According to the data collected by interviews and the previous shipment documents, the on-time deliveries rate is higher than 95%, the data regarding to the interview is in Appendix A & B. However, whether the raw material can be delivered on time can affect the progress of any construction project, it is critical for the transportation process, thus keep improving in on-time deliveries is necessary. Because the company takes full responsibility for the transportation process in all most all the domestic project, thus demurrage cost percentage is not a problem for CRCC. Then is the damage during the transportation, it can be a potential risk for lime transportation. As it mentioned, lime is a corrosive material, the damages during the transportation can give rise to safety threat for drivers or other staffs who work in the transportation process, as well as the environmental pollution. Thus lowering the accident rate in transportation process is critical for CRCC. According to the actual situation of the company, missed appointments percentage, freight bill accuracy, cost per order are not problems for CRCC. The last one is delivery accuracy, which means to deliver the raw material on time with accurate amount. Currently the company is doing okay in this aspect, the only thing they need to do is keeping the current performance in delivery accuracy.

**The issues CRCC need to pay attention to:**
- On-time deliveries (high efficiency, lower waste)
- To avoid damages during the transportation (Corrosive material, environmental protection)
- Delivery accuracy (warehouse efficiency, less waiting time)

**Key quotes from interviews about the Key performance indicators:**
The data regarding to the specific steps and key performance indicator with the process was collected through the interviews with 10 direct participators.

9 interviewees mentioned that the lime transportation process requires highly delivery accuracy, because lime is a corrosive material, the damages during the transportation can be dangerous.

The manager from lime product site mentioned that “the result of the damages during the transportation can be horrible, lime is a corrosive material, and damages during the transportation can lead to environmental pollution and pecuniary loss”
4.2 CSR performance evaluation

This section is about the CSR performance evaluation of CRCC, several models are used. Firstly the monetary and non-monetary performances are analyzed. Then is the corporate maturity, it evaluates the current as well as the desired CSR performance of the company. The next one is UN global compact. It is a criteria provided by United Nation, and the last one is interview summary.

4.2.1 Monetary & non-monetary performance

The business impact of CSR in current transportation process will be analyzed from two aspects, monetary and non-monetary. Based on the current situation of the company, the aspect of monetary includes stronger financial performance and profitability; the company became a member of UN global compact officially at 2010. It is the best example by using CSR and corporate sustainability to produce direct benefits for the bottom line. For example, after 2010, the company has paid more attention to CSR performance. They have done a lot, such as improving the operational efficiencies through reducing energy and materials as input factors for production. However that is not enough, and the waste in both material and personnel still can be improved. The next one is improving reputation and branding, recent years the company has done a lot in participant in the activities regarding to CSR. CSR as a concept with various tools helped CRCC to position itself in the marketplace as a company that is more responsible and more sustainable than its competitors. For non-monetary, it is even more important. Firstly is the employee relations, currently CRCC is doing okay in the relationship with the employee, the satisfaction rate is acceptable by the management team, but the management team still wants to improve the satisfaction rate to a higher level. From some perspectives, employee relationship can affect productivity and innovation directly.

Issues within current transportation process:
Employee relationship management
Improve the operational efficiencies through reducing energy
4.2.2 Corporate maturity in CSR performance

Five stages of corporate maturity
There are five stages of maturity in approaching sustainability. Understanding these stages helps explain where CRCC currently is and visualize where it can aspire to. This chart presents corporate maturity clearly, the chart present in this section is the current performance of CRCC (the second chart is the desired performance in next sub question), and the analysis of this chart will be presented in this section as well. The data of the results shown in the chart were collected through daily observation, discussion with management team and the interview with employee and project manager (during the interview, the interviewees were asked to fill in this chart).

<table>
<thead>
<tr>
<th>Factors</th>
<th>Maturity Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 1 Denier</td>
</tr>
<tr>
<td>Employee and future workforce</td>
<td></td>
</tr>
<tr>
<td>Operational effectiveness</td>
<td></td>
</tr>
<tr>
<td>Brand value and reputation</td>
<td>✓</td>
</tr>
<tr>
<td>The leadership in CSR performance</td>
<td>✓</td>
</tr>
<tr>
<td>Governance &amp; board oversight in</td>
<td>✓</td>
</tr>
<tr>
<td>implementation</td>
<td></td>
</tr>
<tr>
<td>Key performance indicators</td>
<td>✓</td>
</tr>
<tr>
<td>Strategic business units</td>
<td>✓</td>
</tr>
<tr>
<td>People management</td>
<td></td>
</tr>
<tr>
<td>Everybody’s business</td>
<td>✓</td>
</tr>
<tr>
<td>Mutual communication</td>
<td>✓</td>
</tr>
<tr>
<td>Stakeholder relationships</td>
<td></td>
</tr>
<tr>
<td>Transparency &amp; reporting</td>
<td></td>
</tr>
<tr>
<td>Specialist CR function</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 4-5 five stages of corporate maturity (Current performance)

For the current situation, the performance of CRCC is acceptable by the public, but not by the management team; the company is clear about their responsibility for their social, environmental and economic impacts, they need to at least meet the expectation from various stakeholder groups, to play a very positive role in the field of CSR. However, currently the sustainability thinking has not become ingrained in organizational culture and behaviors yet. There is still a space for CRCC to make progress in CSR performance, and this is what the management team wants to make improve. In order to lay a foundation for conducting improvement plan, each factor will be analyzed first.

The first factor is employee and future workforce, the company is in stage 3 at this
moment, which means they have the ability to keep the current employee in their responsible business practice. It is in the middle of 5 stages; their ability to attract and hold talent by their CSR performance is still not enough, as well as the ability to ensure employee loyalty, satisfaction rate and recruitment.

The second factor is operational effectiveness. It refers to the improvements and innovation of an organization as a direct result of creating more effective operations. CRCC is in 4th stage, which means their current performance in CSR, such as exhaust gas emission can create more effectiveness in transportation process. But it is still can be improve. For example, form the opinion of management team, energy consumption during the transportation process is not low enough.

The third one is brand value and reputation, it refers to the benefits realized from responsible business that improve the value of brand and reputation, the company is only in stage 2, CRCR is more commercially strategic oriented, which means they have not done and promote enough in responsible business. Thus they cannot obtain much benefit in building reputation from their current CSR performance.

Next one is the leadership in CSR performance, currently, the company is in the 2nd stage, which means they still need to strengthen the leadership, the management level needs to have a clear view about what and how to make progress in CSR performance.

Then is governance & board oversight in implementation. This one is linked with leadership and also staying in the same stage with leadership. Ensuring and monitoring the quality in CSR activities implementation is essential. At present, the oversight is not sufficient enough, thus the implementation CRCC needs to put more effort into governance and board oversight in implementation.

For strategic business, currently the company pays more attention on the cost and efficiency but not on environmental protection. Thus they still can make improvements on adding more CSR activities into their strategic business.

The next factor is people management, currently the company only focuses on employee’s satisfaction rate but not at the level of people development and employee engagement.

For the factor of everybody’s business, currently the company only pays attention to the specific tasks, but not to the level of social interconnection, such as social entrepreneurs encouraged.

The next one is mutual communications. For this factor, CRCC is in stage 3, the company attaches importance to mutual communication with various stakeholders, but it still lacks of insight in strategic level.
For the factor of stakeholder relationships, the company is in stage 3, which means they can influence each other and towards engagement. Then is transparency & reporting, currently the company establishes CSR report every year, but it does not contain too much details, only the general information.

**The mean issues within the current transportation process are: (5 stages of corporate maturity)**
- the awareness about brand value and reputation is not enough,
- the leadership in CSR performance is not strong enough
- lack of governance & board oversight in implementation
- lack of transparency & reporting in CSR performance,
- the company need specialists in CR function.

**Five stages of corporate maturity** is used to investigate the desired situation of the company, different factors from this model are listed in the chart of five stages of corporate maturity, the analysis of those factors presents after the chart.

**The chart 4-6 is the desired situation of CRCC in corporate maturity**, after the analysis of current situation, a general background regarding to the performance of CRCC in corporate maturity is clear. Then it provided a foundation for the company to formulate the general idea about what they want to achieve in corporate maturity performance in the future. The analysis is presented in next section. The result shown in this chart is also collected through daily observation, discussion with management team, the interview with employee and project manager. During the interviews, the interviewees were asked to fill in this chart.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Maturity Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 1 Denier</td>
</tr>
<tr>
<td>Employee and future workforce</td>
<td></td>
</tr>
<tr>
<td>Operational effectiveness</td>
<td></td>
</tr>
<tr>
<td>Brand value and reputation</td>
<td>✓</td>
</tr>
<tr>
<td>The leadership in CSR performance</td>
<td></td>
</tr>
<tr>
<td>Governance &amp; board oversight in implementation</td>
<td></td>
</tr>
<tr>
<td>Key performance indicators</td>
<td>✓</td>
</tr>
<tr>
<td>Strategic business units</td>
<td></td>
</tr>
<tr>
<td>People management</td>
<td></td>
</tr>
<tr>
<td>Everybody’s business</td>
<td></td>
</tr>
<tr>
<td>Mutual communication</td>
<td></td>
</tr>
<tr>
<td>Stakeholder relationships</td>
<td></td>
</tr>
<tr>
<td>Transparency &amp; reporting</td>
<td></td>
</tr>
</tbody>
</table>

Table 4-6 Five stages of corporate maturity (Desired performance)
For employee and future workforce, the company was in stage 3, they want to achieve stage 4, not only making the current employee satisfied about the company, but also having the ability to attract and hold talent by their CSR performance, as well as increasing the loyalty of current employee.

The second factor is operational effectiveness. What the company have done so far is acceptable by the management team. But in their point of view, more progress refers to this field still can be achieved, such as using more renewable resources of equipment, as well as lowering the energy consumption during the transportation process. For operational level, switching from transportation process with some CSR activities to CSR strategic transportation process, making the insight of CSR into each part of the process then to affect the participants, improving operational effectiveness are the major aims.

The third one is brand value and reputation. The company's CSR performance cannot influence the brand reputation so much. Thus they want to switch from commercially strategic oriented to CSR strategic oriented, it is the current and future market trend, especially for international enterprise like CRCC, by implementing more CSR activities, caring more about environmental protection and contributing to the society the company can attract the attention from public, but not because of their successful and famous constriction project. It is more meaningful for a company who wants to promote their positive image in CSR performance.

Next one is the leadership in CSR performance. The management team just realized the importance of leadership in CSR performance. Otherwise employees will not pay attention to the advises regarding to CSR, like energy saving, the company want to achieve to stage 4; the management team should transmit compulsive requirement to employee, after having a clear view of what activities should be done for CSR performance, leadership should be strict and mandatory.

Then is governance & board oversight in implementation. CRCC wants to reach stage 4, which means to make the oversight sufficient. The company will put more effort into governance and board oversight in implementation.

For strategic business, the company wants to reach stage 4, which means they want to innovate both internally and externally, and sophisticated understand when adopt, adapt.

The next factor is people management; the company wants to make the stakeholders fully engaged, and to make the company a great place to work, like GOOGLE.

For the factor of everybody’s business, the company wants to make the company to the level of social interconnection, such as social entrepreneurs encouraged.
Then is mutual communication, the desired situation for CRCC is building mutual communication relationship in strategic level with various stakeholders, then maximizing the common interests.

For the factor of stakeholder relationships, the company wants to reach to stage 4, which means implementing stakeholder engagement successfully, and realizing multi-organization alliances, and be actively seeking new forms of collaboration.

Then is transparency & reporting. Company is desired to reach stage 4, which means they want to establish transparent CSR report, also to assure that the supervision is linked to management processes, eg European Foundation For Quality Management.

**Desired situation:**
- Highly awareness about brand value and reputation
- Strong leadership in CSR performance
- Enough governance & board oversight in implementation
- transparency & reporting in CSR performance,
- the company has more than 2 specialists in CR function.

**4.2.3 UN global compact**
CRCC has officially became a member of **UN global compact** at March 2010, the company can respond to the ten principles in human rights, laborer rights, environmental protection and anti-corruption and sustainable development principle among enterprise, society and nature, and actively integrated them into the overall corporate strategy and operation.

Based on the current situation of the transportation process, labor rights, environmental protection and sustainable development principle among society and nature are the key issues. For labor rights, firstly the work overtime is a problem, especially for the drivers. Because fatigue driving may cause accident, and the working condition still can be improved, as well as the employee welfare. The next one is environmental protection, which includes exhaust gas emission, waste in transportation process.

As it mentioned in last section, CRCC has officially became a member of UN global compact at March 2010, although the company can respond to the ten principles as human rights, laborer rights, environmental protection and anti-corruption and sustainable development principle among enterprise, society and nature, and actively integrate them into the overall corporate strategy and operation, there is still a gap between current and desired situation in transportation process. Firstly, human rights and laborer rights are discussed. In order to avoid work overtime, the company wants
to cultivate talents with sufficient quantity, high quality, reasonable structure and matched specialty, create an energetic and more open environment for talent development, build human resource structure compatible with corporate transformation and domestic & international business development, keep the quantity, quality and degree of internationalization of talents leading among the central enterprises. The company respected employee’s right to know, the right to participate, the right to supervise and the right to express. CRCC set up and perfected the security system of trade union organization of each level, workers’ congress system, etc.

Employee welfare is critical for remaining the talent. The company wants to achieve good results on distribution system reform, further strengthen the distribution relations, fully implement collective negotiations mechanism of wages, wage payment guarantee mechanism, and minimum wage guarantee system, and realize harmonious and stable labor relation. For environmental protection CRCC wants to achieve remarkable results on energy conservation and emission reduction in key areas; new offices implement mandatory energy conservation standard completely, reduce specific energy consumption per operation revenue of RMB 10,000 by 20% compared with 2010, comprehensively use industrial solid wastes over 60%, control and reduce pollutant emission, and various emissions reach the national or industrial advanced standard. The company wants to eliminate serious accidents in transportation process and realize casualty rate caused by various accidents in production and assessment control index under the related provisions of the state;

Key quotes from interview:
All of the interviewees answered the question of the “the changes after CRCC joined UN global compact”, due to the 2 directors from logistics department were from management level, thus these 2 interviewees have clearer view of the changes than other interviewees.

The changes they mentioned:
“After the company joined UN global compact, energy consumption has been reduced significantly, CRCC always seek to the way of reducing energy consumption, the office lighting system was also updated last year.”

“The company has a better relation with labor; they have created an energetic and open environment for talent development”

Changes after joined UN Global Compact:
- Create an energetic and open environment for talent development
- □ Reduce specific energy consumption
- □ Control and reduce pollutant emission
- □ Realize harmonious and stable labor relation
- □ Eliminate serious accidents in transportation process

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4.2.4 Interview summary regarding to the CSR performance

The CSR performance of CRCC in transportation process is also evaluated by the interviewees, also problems in current transportation process are mainly from 3 perspectives, warehousing, transportation and stakeholders. More details about the interview are in Appendix A.

For the aspect of warehousing, because of the character of quick lime, the type of warehouse is outdoor warehouse, which located in the mined and processed site. There is no doubt that it can affect the surrounding environment more or less. Thus the company wants to conduct some actions to lower the impact to environment. Moreover the product and warehouse safety also needs to be taken into account; lime slaking is a reaction between water and quick lime, the reaction can lead to high heat release; it is dangerous for both people and equipment.

For the aspect of transportation, the dust of quick lime in loading, transportation and unloading has to be taken into consideration, it is also regarding to environment. From the perspective of the company, in order to achieve long term development, it is necessary to lower the damage of environment as much as possible, such as to lower the energy consumption in transportation as well as to lower the exhaust gas emission.

The last aspect is the stakeholders in the transportation process; the most essential concerns of the company is stakeholders satisfaction, based on the internal data of the company, the satisfaction of employee still can be improved, as well as to improve the welfare of the employee, the management team still not satisfied with the current rate. Then is achieving and extending the expectation of the stakeholders; by caring more about CSR, the company can get benefit for long run.

Summary of the problems (data collects from interview):
  • Working condition in warehouse
  • Employee’s safety
  • Environmental protection
  • Dust in loading and unloading
  • Energy consumption during transportation
  • Exhaust gas emission
  • Stakeholder satisfaction rate
  • Stakeholders expectation
4.3 Desired situation of the company in CSR performance

The desired situation should match the goal of this project completely, which should be presented specifically; firstly case study provides ideas of what activity CRCC can do to achieve their desired situation. Then the interview shows the expectations from stakeholders.

4.3.1 Case study of successful CSR integration cases

The successful CSR integration cases can be referenced here; those cases can provide the company,

The DHL case study is referred in this section. The approach of Deutsche Post DHL was to provide the framework towards their corporate responsibility strategy and to allow each region and subsequently each country or territory to translate this and fit their local national as well as cultural needs: Go Help, Go Teach and Go Green. It is a successful CSR integration case, DHL is a logistics company. This thesis focuses on transportation process, both of them are in the same industry, the activities of DHL in CSR integration can be referenced for CRCC in their integration.

✓ Realize go green in transportation process

The key focus of go green is reducing CO2 emissions, CO2 emissions can be reduced from various aspects, such as to use energy saving flue, and control the warehouse lighting.

✓ High transportation efficiency in services

With respect to bio-fuels, truck fleet vendor can use bio-fuel ready vehicles to improve the transportation efficiency. Moreover, CRCC can monitor the efficiency by the use of GPS management system. From an internal performance measurement characteristic, this eco-efficiency measurement serves as one of the main KPI's for the transport director.

✓ High warehouse and office efficiency

Like the example of DHL, an eco-efficiency assets center on both warehouse and office eco-efficiency can be considered. This is particularly relevant with respect to the nature of 24 hour, seven days a week warehouses and storage points usage and centers primarily on lighting projects, and to a lesser extent the air-conditioning and cooling requirements. At the office level, it centers on the IT-based contributions from office-based systems usage.

✓ Less paper use, recycle efficiency

To use more e-document to reduce paper use and increase recycled paper consumption. In different departments and business units more e-document should be used, such as vehicle scheduling, in purely the reduction of paper.
✓ **Stakeholder engaged**

Stakeholder engagement is intended to help the company fully realize the benefits of engage the stakeholder in the organization, to compete in an increasingly complex and ever-changing business environment, while at the same time bringing about systemic change towards sustainable development. Along with employee engagement being generally recognized as an essential strategic component to nurture and establish for embedding CSR (Ferguson and Clerke, 2011), CSR has long recognized employee well-being as a relevant performance metric factor and with respect to stakeholder theory and strategic stakeholder management.

**Another case study is Toyota Motor Thailand (TMT) Co., Ltd.**

TMT has integrated CSR across their value chain throughout their network: suppliers, dealers and stakeholders. The responsibilities of TMT for environment, society and customers are integrated in every process from designing, purchasing, manufacturing, logistics, marketing, sales and after-sales service; that is what CRCC needs to learn. By redesigning the TMT’s integration model, CRCC can have their own integration model.

**CRCC can integrate CSR practices across its value chain in 3 major modules:**

**Green Purchasing & Manufacturing**

Firstly, for purchasing part, such as warehouse facility, the supplier should meet the international safety standards, without any form of forced or child labor, and use fair practice without prejudice. CRCC also can set out a “Supplier CSR Guidelines” like TMT. Moreover, CRCC also needs to pay attention to the excessive use of energy or emit excessive gases in the operation of transportation process, as that will contribute to global warming in the production process. CRCC should select recyclable products whenever possible.

Reducing exhaust gas emissions is always the core in road transportation. By updating the vehicle to EU IV discharge standards this problem can be solved. Expanding into the use of alternative and renewable energy sources can reduce the CO2 emissions. Moreover, CRCC also can practice waste separation, and encourage recycling and reusing, and avoid buying products that are difficult to degrade.

**Responsible Management & Marketing**

CRCC is always trying to provide a high-standard work environment in terms of safety and health. The only thing the company needs to do is keeping current good performance in creating good working environment. Like TMT, CRCC also can update their training courses for self-development and career growth to their employees at all levels. The current training course is too simple. Employee and customer satisfaction rate can be improved by quick response.
Contribution to Society & Community
CRCC upholds their responsibilities to the stakeholders every quarter, and it makes their CSR report transparent. Like TMT, CRCC should also try to improve a better standard of living in the surrounding areas of the lime production sites.

4.3.2 Interview summary
The data of the desired situation form various stakeholders is mainly obtained from interviews, the interview transcripts are in appendix A.

Interview summary from various stakeholders regarding to the desired situation of the company in CSR performance within transportation process

After the interview with different groups in the company, a general idea of what are the different expectations from employee, management team as well as clients in the company’s CSR performance is clear.

Key quotes from interview:

From 2 warehouse staffs “I hope to see a better working condition, our safety can be 100% ensured, and the preventive measures for accident should be improved”

From the staff in transportation department “To have an effective platform for employees to provide their ideas related to CSR, and the management team can really take their ideas into account”

From 2 directors in logistics department of CRCC “the management level wants to integrate the thought of being “green” into every employee, but not only to make them to comply with certain regulations”

For employee:
✓ Better working condition in warehouse, and during the transportation.
✓ To guarantee the employee’s safety by improving current compensation system, to make employees feel 100% assured with total working condition including welfare.
✓ To have an effective platform for employees to provide their ideas related to CSR, and the management team can really take their ideas into account.
✓ Key issue discussion board to be more transparency.
✓ Labor council can work with high efficiency.

For management team:
✓ To integrate the thought of being “green” into every employee, but not only to make them to comply with certain regulations.
To make the company become an industry representative in CSR performance, to promote their positive image by adding a “green tag”.

To switch the total transportation strategy form commercially to strategically in CSR, in order to achieve sustainable development.

Keeping innovate, always seeking for new ideas

For client:

To build strategic CSR multi-organization alliance, to obtain common interests in long term.

Actively seeking new forms of collaboration, and information sharing.

Multi communication

Based on the data collected from interview, the key issues for each stakeholder and list of communication activities conducted on each issue can be summarized as follows:

4-7 Key issues mentioned by various stakeholders
During the interview, stakeholders were asked to provide potential actions to solve the problems that they mentioned, the agendas and actions to take are listed below:

### Customer:

<table>
<thead>
<tr>
<th>Agenda</th>
<th>Actions to take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction rate</td>
<td>Conduct 3rd party customer satisfaction surveys</td>
</tr>
<tr>
<td>Supplier CSR policy</td>
<td>Discussed supplier related CSR policies at working level and executive meetings on purchasing transportation equipment</td>
</tr>
<tr>
<td>Inquiries regarding to CSR</td>
<td>To response fast, conduct meetings for future research</td>
</tr>
<tr>
<td>Energy saving</td>
<td>To lower the energy consumption during the transportation</td>
</tr>
</tbody>
</table>

### Employee:

<table>
<thead>
<tr>
<th>Agenda</th>
<th>Actions to take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction rate</td>
<td>Employee satisfaction surveys</td>
</tr>
<tr>
<td>Improve working condition</td>
<td>Improve working environment, employee welfare, to ensure employee’s safety</td>
</tr>
<tr>
<td>Mutual communication</td>
<td>Key issue discussion board</td>
</tr>
<tr>
<td>To extend the employee’s expectation</td>
<td>To pay more attention to labor council management</td>
</tr>
</tbody>
</table>

### Supplier:

<table>
<thead>
<tr>
<th>Agenda</th>
<th>Actions to take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutually beneficial corporation</td>
<td>Supplier networking latest news and best practice sharing</td>
</tr>
</tbody>
</table>

### Social media, social community and government:

<table>
<thead>
<tr>
<th>Agenda</th>
<th>Actions to take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hear the voice from public</td>
<td>Online survey, to have a clear view about what public think about the CSR performance of CRCC</td>
</tr>
<tr>
<td>CSR conference</td>
<td>Conduct CSR conference every quarter, to provide a platform for the public to participant, to improve the mutual communication</td>
</tr>
<tr>
<td>Contributions in charity</td>
<td>To contribute to the society by doing charity in different fields</td>
</tr>
</tbody>
</table>

After summarizing the data from interview, several CSR activities are determined, those activities will be a part of the CSR activities in implementation plan, and the specific implementation plan will be presented in the main research question “How to integrate CSR activities into the transportation process”.

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4.3.3 Section summary

**Summary of the desired situation in transportation process:**
The summary of the desired situation in transportation process is also classified into 3 catalogs, environment, stakeholder and operation.

**Environment:**
✓ Realize go green in transportation process
✓ Reduce specific energy consumption
✓ Control and reduce pollutant emission
✓ Less paper use, recycle efficiency, especially in step of shipment scheduling

**Stakeholder:**
✓ Realize harmonious and stable labor relation
✓ Stakeholder engaged
✓ To meet or the expectation of various stakeholders (the data collected from interview is summarized by stakeholder groups in 4.3.1)

**Operation:**
✓ High transportation efficiency in services (can lower the waste)
✓ Strong leadership in CSR performance
✓ Enough governance & board oversight in implementation
✓ Transparency & reporting in CSR performance,
✓ The company has more than 2 specialists in CR function.
✓ Create an energetic and open environment for talent development
✓ Eliminate serious accidents in transportation process
✓ High warehouse and office efficiency
4.4 CSR integration

The core research object of this project is to integrate “CSR activities” that fits the current situation of the company into their transportation process. Thus after answering the sub questions, the general information regarding to the desired situation in transportation, potential CSR activities suitable for the company to improve the current situation then to reach desired situation are clear; thus the main research question should focus on “how”, it is a kind of implementation plan which maps out the implementation process. Firstly the stakeholder engagement is conduction, it can be seen as the basis of implementation plan, the implementation plan cannot be conducted smoothly unless the stakeholders are engaged, it is essential for any business.

4.4.1 Potential CSR activities in raw material transportation process
In order to determine the potential CSR activities that suitable for the company, a comparison between current and desired situation is conducted. Then the possible activities to fill in the gap between current and desired situation can be investigated.

Gap analysis
Data regarding to both current situation and the desired situation of the transportation process are obtained, Thus in order to have a clear view of what CSR activities can be done to fulfill the gap between current situation and desired situation a gap analysis is conducted.

As it shown in graph 4-5, there three parts in this chart, left side is the current situation of the company regarding to their current CSR performance in transportation process, the right side is the desired situation of the company, which is matched the expectation of the company, in the middle is the actions to take in order to fulfill the gap between desired situation and desired situation

The data regarding to current situation is mainly obtained from the daily observation as well as interview, the desired situation is formed by both the result from research question 2 “What is the desired situation of the company in domestic raw material transportation process regarding to CSR?” and interview.
<table>
<thead>
<tr>
<th>Current situation</th>
<th>Actions to take (general but not specific actions)</th>
<th>Desired situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclear targets from management team</td>
<td>Strengthen the leadership, conduct researches and meetings to determine the targets as well as the implementation plan</td>
<td>The management team has clear targets about what kind of activities should the company do every quarter, as well as the implementation plan</td>
</tr>
<tr>
<td>Insufficient oversight</td>
<td>Increase the transparency of the supervision</td>
<td>Sufficient oversight in CSR activities implementation</td>
</tr>
<tr>
<td>The overall strategy (focus too much on cost and speed, but not on energy consumption) of the transportation process cannot match the CSR requirements</td>
<td>Revise and improve the overall strategy, to integrate suitable CSR activities into the overall strategy, to take various factors, such as speed, cost, energy consumption, employee working condition into account</td>
<td>Overall strategy is integrated with the CSR activities perfectly. The company can gain benefit in both profit and positive social impact in CSR performance.</td>
</tr>
<tr>
<td>The company lack of specialists in current in the field of CSR</td>
<td>Invite CSR specialists in different fields, such as in environmental protection and in promote positive social image</td>
<td>The company has specialists in the field of CSR, to help the company achieve their goal in CSR performance.</td>
</tr>
<tr>
<td>The overall satisfaction rate from various groups still can be improved</td>
<td>To improve the satisfaction rate from 3 groups, employee, customer and society, to conduct specific CSR activities improvement plan for 3 groups.</td>
<td>The satisfaction rate is improved significantly</td>
</tr>
<tr>
<td>Environmental impacts is not low enough</td>
<td>Short term: fuel efficiency, vehicle emissions controls Long term: renewable energy, renewable resources. To focus on entire life cycle of transport system</td>
<td>Environmental impacts of the process is low</td>
</tr>
<tr>
<td>The social impact in CSR performance is not strong enough</td>
<td>To contribute more to society, as well as to promote this kind of image in social media, to participant more in charity</td>
<td>To promote a very positive social image to public in CSR performance</td>
</tr>
</tbody>
</table>
Summary of the potential CSR activities:

CSR activities from the aspect of environment:
- Seal the raw material carefully
- Update the vehicles, 80% vehicles meet EU IV discharge standards before 2015
- To turn off the electric appliances during the lunch time and after work
- To use as e-document
- To use recycled paper.
- To use energy saving flue
- Warehouse and office lighting
- Fuel efficiency, vehicle emissions controls
- To use renewable energy, renewable resources.
- To focus on entire life cycle of transport system

CSR activities from the aspect of stakeholder:
- To improve the satisfaction rate from 3 groups, employee, customer and society, to conduct specific CSR activities improvement plan for 3 groups.
- To improve current compensation system
- To build an effective platform for employees to provide their ideas
- Key issue discussion board to be more transparency.
- Labor council can work with high efficiency.
- To build strategic CSR multi-organization alliance
- Conduct 3rd party satisfaction survey
- Multi communication
- Conduct stakeholder engagement

CSR activities from the aspect of operation:
- Strengthen the leadership
- Increase the transparency of the supervision
- To add more details in the annual CSR report, to update the CSR activities weekly or monthly in the official website of CRCC
- Invite CSR specialists in different fields, such as in environmental protection and in promote positive social image
- Triple check in shipment scheduling
- To use GPS system to monitor the vehicles during the transportation process
- To contribute more to society, as well as to promote this kind of image in social media, to participant more in charity.
4.4.2 The implementation CSR activity

The whole implementation plan is the specific steps to make the CSR activities listed in last paragraph become realistic and workable; the **PDCA cycle** will be used in this section. The elements regarding to sustainable development will be integrated into this model. It will be the main model used for composing the implementation plan.

There are 4 main steps in this model. Since this project is mainly about composing an implementation plan, the first main step ‘plan’ is the most essential step for this project. The rest steps “do”, “check” and “action” are the subsequent steps after the implementation plan is formulated. Those steps are not the key points of this research, and will not be presented as specific as first step. Moreover, common policy and leadership will go through the whole process, to ensure the total quality of the project.

![PDCA Cycle](image)

**The first step is plan.**

**Which includes:**

- **SD position of the company**
  For sustainable development position of the company, the answerer of this question is linked with the current and desired situation of the company in CSR performance which presents in sub question.

  The SD position for CRCC is conducting business to promote economic growth, as well as to create economic value of the company with environmental protection and vibrant communities. In other words, the company should **meet the 'the triple bottom**
line’, it is made up of “social equity, economic, and environmental” factors.

People: An organization has a responsibility to its employees and to the wider communities in which it works. A triple bottom line company understands how its practices affect the corporation, its workers, and wider stakeholders, and it works to promote all of their best interests.

Planet: Committing to sustainable environmental practices is good business. Corporations can save money and reduce their environmental footprints by reducing waste, conserving energy, and maintaining environmentally safe manufacturing processes.

Profit: Clearly, making money is essential to business success. A triple bottom line company, however, recognizes that its own sustainability rests on its ability to work harmoniously in its social and environmental settings. For this reason, the costs of pollution, worker displacement, and other factors are included in profit calculations.

➢ Company strategy
The company strategy basically contains 4 aspects:

• Integration – Clearly and completely integrate economic, social and environmental considerations into strategic planning, decision-making and operating processes.

• Stakeholder Engagement – To fully engage the stakeholder, to have a clear view about their expectations, and also incorporate the strategy of CRCC with the stakeholders.

• Knowledge Management – Share both successes and failures to learn from the past experiences.

• Innovation – Create a culture that brings new, innovative thinking to the challenges of evolving business environment.

➢ Long range implementation plans
The implementation plan will be composed with different categories: Environment, stakeholder and operation. The corresponding potential CSR activities of each group are already determined in sub question 3. Thus the implementation plan will be the specific actions to make those activities become realistic and workable.

CSR activities from the aspect of social and environment:

✓ To use as e-document and recycled paper.
More e-documents should be used; it is also the current business trend. E-document is also more convenient to store. For some special situation, it has to use the paper document, to use recycle paper.
✓ Warehouse and office lighting
Currently the warehouse lighting system is manually operated, although the lamps are energy saving lamps, if the light turns on for long time can cause light pollution as well as high CO2 emission, sound control system should be introduced. It is more reasonable for current warehouse. The energy saving lamps are already used in the all the offices of CRCC, not only the departments in transportation process, but the problem is those lamps always work for 10 hours. The lights should be turned off during the lunch time and after work, if the sunshine can light the office bright enough, lights can be turned off.

✓ Fuel efficiency, vehicle emissions controls
In order to control the exhaust gas emission, CRCC will update the vehicles since 2014, 80% vehicles can meet EU IV discharge standards before 2015, the exhaust gas emission can be lesser. For the new vehicles, energy saving flue can be used, although the cost seems become more, but for long term, the company not only can get benefit from less energy consumption but also the sustainable development.

✓ To lower the energy consumption
Energy consumption is always a hot topic for any CSR case; for CRCC it is also essential, as well as the expectation of the customer; in the condition of ensure the speed; both CRCC and customer want to see the lower energy consumption. The company needs to the integrate the thought of saving energy by promoting the advantages of energy saving from management team to employee, the electronic devices such as printer, and displayer should be turned off during the lunch time and after work, each department should evaluate the monthly energy consumption in order to make comparison with previous months, to combine the ideas and opinions from employee and customers to find the best way to lower the energy consumption.

✓ Establish new energy consumption plan,
  ■ Short term: fuel efficiency, vehicle emissions controls
For short term, CRCC will test and apply a new automobile exhaust purifier this year, because the cost of using automobile exhaust purifier in every carrier vehicle is high, thus firstly they will only apply this purifier in few lines to test and record whether the volume of vehicle emission can be controlled, if the result is positive, the company will invest this technic in all the lines. Moreover, in Japan, the fuel consumption in road transportation is 20% lower than China, the company will also invite the expertise to conduct research and to analysis how can the company learn from the success experience from Japan.

  ■ Long term: renewable energy, renewable resources. To focus on entire life cycle of transport system
For long term, CRCC will also focus on renewable energy and resources, it is the current trend. After the short term energy consumption plan is realized, the company
will start to focus on the entire life cycle of transportation system, they will calculate the overall costs of project alternatives, one is the current one, another is substitute renewable resources, and to select the design that ensures the system will provide the higher total value and lower overall cost of operation consistent with its quality and function.

- To contribute more to society, create more employment opportunity for migrants and graduate students
CRCC can continuously create more employment opportunity and to make its contribution to solving employment of migrant workers, improving income of farmers and maintaining social stability.

- To participant in public welfare activity
In order to perform social responsibility, CRCC should actively devote to various public welfare activities, follow the co-construction of society and community, actively benefit the society and keep on making due contribution to improvement of living environment for people.

**CSR activities from the aspect of stakeholder:**
- To improve the satisfaction rate from 3 groups, employee, customer and society, to conduct specific CSR activities improvement plan for 3 groups.

The employee satisfaction surveys will be conducted regularly through the internet, an online satisfaction survey platform will be used, and the valid data will be analyzed, in order to find what progress the company have made in every quarter, as well as what the company should do the meet the requirements from employee.

Conduct online survey, to have a clear view about what public think about the CSR performance of CRCC
CRCC has an online feedback platform on their official website, that platform allows public to provide their opinion about the CSR performance of CRCC, then the data will be collected and analyzed by expertise, after that the company can have a clear view what they should do to meet the expectation from public, it is also a reference for formulating future CSR strategy.

Conduct 3rd party customer satisfaction surveys
The company will choose a 3rd party to conduct customer satisfaction surveys, because customer are open to give feedback to a 3rd party than to CRCC, a 3rd party is assigned calling periods and cycles, reporting and data analysis takes time and expertise. Then CRCC can get a complete analyzed data, which can be used for formulation improvement plans.

- Improve working environment, employee welfare, to ensure employee’s safety
Firstly the working condition in warehouse will be improved, the management team should make the warehouse management standardized to a higher level, regular check is not frequently enough, employees who work in warehouse will be appointed as the monitors randomly, every person will have a chance to be a monitor every week, it can foster the thought of building a good working environment by common contribution; the monitor will responsible for regular check of the warehouse facility and operation, especially in sealing the raw material, because this is biggest problem exist now, and the dust can damage the health of the workers, what the monitor need to do is to check whether the operation in warehouse is smooth, in order to avoid as much dust as possible.

Overall, the company will provide less stressful working conditions and giving extra care to the staff who living away from family, it is important to look at fostering personal happiness and professional growth. Investing in employees pays dividends in terms of greater loyalty as well as higher productivity.

- Key issue discussion board
  Key issue discussion board provide a platform for employee to present their ideas and thoughts about the company’s operation as well as the emerging issues regarding to CSR, it can realize the liberalization of presenting opinions. Then those opinions will be summarized into categories and handed in to the management team.

- To pay more attention to labor council management
  Employees can express their dissatisfaction and suggestion related to their rights to labor council, the management team will pay more attention to the feedback from labor council, to solve to problems related to labor rights, to protect the rights and interests of employee.

- Discussed supplier related CSR policies at working level and executive meetings on purchasing transportation equipment
  In order to make customer satisfied about the performance of CRCC in transportation process, the company will also sets out the CSR policies at working level and executive meetings on purchasing transportation equipment, as well as the facilities used for lime storage, in order to test and make sure the exhaust gas emission is under the average level of last year.

- Conduct CSR conference every quarter, to provide a platform for the public to participant, to improve the mutual communication
  CRCC will also conduct CSR conference every quarter, representatives from different fields will be invited, such as employee, customer, supplier, as well as social media, the communities that helped by CRCC. What the company have done in every quarter will be introduced, participators can also express their opinion after the conference.

- To contribute to the society by doing charity in different fields
Doing charity in different fields is a good way to promote the positive image of CRCC to public; currently the company donates to some social communities, such as the disable people who does not have ability to work, but they only

**CSR activities from the aspect of operation:**

- Increase the transparency of the supervision, to let public know about what the company done in every stage of CSR performance
  
  As it mentioned, the company will publish what activities they have done in every quarter on their official website, in order to show a transparency CSR activities implementation process to the public. Moreover, CRCC will also hold CSR conference to let the public to have opportunities to participant.

- Invite CSR specialists, to have professional advices in environmental protection and in promote positive social image
  
  The company needs to invite specialists or corporate with Consultancy Company in order to have the professional advices in the field of CSR, such as environmental protection.

- Strengthen the leadership, conduct researches and meetings to determine the targets as well as the implementation plan
  
  The company will also strengthen the leadership; they will develop a leadership development program, by mapping out the big picture of the business down to the specific personal shared vision of success as part of creating a focused CSR oriented business plan.

- Triple check in shipment scheduling, to monitor the vehicles by GPS system
  
  The accurate and on time delivery can be realized by strengthening supervision in shipment scheduling, and to use GPS system to monitor the vehicles during the transportation process, as well as to track the status of the driver, in order to avoid fatigue driving.

After the implementation plan is clear, the next step will be DO, as it mentioned, this research is mainly focused on formulating implementation plan, thus the rest step will be analyzed briefly.

**The second step is Do.**

This step is mainly about the CSR activities implementation, it will be divided into two periods. During the implementation, the company will also need to pay attention to mutual communication, and collecting the feedback from participators, in order to provide a foundation for future improvements, during the implementation, the company also need to pay attention to functional excellence of each department, as well as to keep the whole implementation process transparency.
The timeline for the implementation will be decided by the management, every activity will have a due date, such as from March to lower the energy consumption 10% within 6 months; after the discussion with management team, this implementation plan will only divided into two periods, short and long period.

**Short term**

**Period:** 1st month – 10th month  
**Cost:** Medium

For short term implementation the company needs to mainly focus on the operation and stakeholder, these two elements are the basis for any company who wants to implement CSR activity. And it is also easier for CRCC to start the CSR activity implementation form making changes within the company first. The CSR activities regarding to operation and stakeholders, such as employee and client will be conducted at the beginning, the goal for short term is to start applying all the CSR activities in the implementation plan related to employee, client and operation based on the timeline decided by the management team, as well as to monitor and record the progress every month in order to provide a foundation for future adjustments. The cost is relatively medium comparing with social focuses.

**Long term**

**Period:** after 10th month  
**Cost:** high

For long term implementation, the company needs to mainly focus on the environmental and social level, which means to implement the CSR activities related to social aspect, such as to contribute to the society by doing charity in different fields or to conduct CSR conference, to corporate with social media, to promote a positive image of the company in doing well in the field of CSR. The activities

The **third step is Check**, this step is mainly about the assessment of implementation, to find out the imperfections in implementation, then to analysis and review the action plan again, as well as to evaluate the environmental and social performance of the company. After that the company will publish an external reporting to let the external participators to know the progress of implementation. The whole implementation process will be checked in this step specially, to find out the improvement points, because the implementation plan is classified into 3 catalogs, it will be easier for the management team to have a clear view of what should be improved.

The **last step is ACT**, after the assessment, the company will have a clear view of what imperfections they need to improve, and then they will need to formulate a strategy action plan for future improvements, as well as to review the whole project at the same time, then to implement the action plan again.
4.5.1 Difficulties in CSR activity integration

Implementation is the most difficult part of the whole process. It involves achieving the objectives set out in the beginning while remaining alert and flexible to new opportunities as they unfold.

To achieve effective implementation, the management team of CRCC needs to ensure that any changes initiated by the implementation plan are reflected in areas such as budgeting, reward schemes and information systems. The overall goal is to integrate the results of implementation plan with daily, weekly and monthly routines. Moreover, there will some potential difficulties implementation. In order to make the implementation successful, the potential difficulties will be analyzed.

Potential difficulties:

- The first one is common implementation mistakes.
  This one includes lacking of communication, which means the implementation plan is not communicated to front-line employees, who are therefore unable to receive the correct indications from management level.
  The next one can be losing sight, management team may only focus on day-to-day operating problems that they lose sight of the long-term goal.

- Hard to reach out to all stakeholders
  Because of the scope of this project, reaching out to all stakeholders may become a potential difficulties, it will also test whether the communication channels between CRCC and stakeholders are smooth enough.

- Unclear progress measurements in CSR activities implementation
  Progress measurement is also important in implementation. It can provide a foundation for adjustments, and thus the measurements have to be specific and accurate.

- Monitor the implementation effectively
  During the implementation, the management team may measure what is easy to measure first, but not what is important to measure.

4.5.3 Potential solutions to prevent those difficulties

To control and avoid those difficulties

- Common mistakes in implementation
  To integrate the whole communication process, ensuring the communication flow is accurate and correct from top to bottom. The management team have to provide clear sights to lower level employees, and they also need to prioritize the tasks reasonable
in implementation.

- **Hard to reach out to all stakeholders**
  For the internal stakeholder, in order to integrate the thought of CSR into their daily work, the department manager can conduct informal chat with employees, take the written CSR activities implementation plan document back to the people that they influence and discuss it with them in a conversational manner.
  Setting up a feedback mechanism – suggestion box, one-on-one meeting, monthly updates – so that they have a chance to respond as well.
  To ensure all the communication channels are opened, keep in touch with various external stakeholders at least monthly, it can generate more helpful ideas and suggestions.

- **Unclear progress measurements in CSR activities implementation**
  The progress of implementation can be measured through key indicators such as energy consumption, stakeholder satisfaction rate and so on. In order to make comparison with the previous months' achievements, the management team needs to have a clear view of what they have achieved in every period, it can provide a foundation for managing the whole implementation process.

- **Monitor the implementation effectively**
  Monitoring the implementation is crucial for making adjustments, the whole implementation can be monitored by several guidelines:

  • **Regular updates.**
    Review the implementation progress on a monthly or quarterly basis, depending on the level of activity.

  • **Create a champion for every activity.**
    The CSR activity implementation champion has to be someone other than the CEO, because the latter isn't accountable to anyone. The champion doesn't necessarily have to complete the actions, but must see that they get done.

  • **Conduct short-term implementation reviews.**
    The company needs to schedule team "huddles" every 90 days to keep the implementation plan reviewed, reloaded and re-energised. These huddles also allow the management team to distinguish those individuals who are getting things done and those who are not. These are an opportunity to take another look at the original plan, determine whether the research objectives are being met, and agree new action steps as necessary.

  • **Expand skills.**
    In the weeks and months following the implementation process, expand employee skills through training, recruitment or acquisition to include new competencies.
required by the implementation plan.

• Set CSR activity implementation milestones.  
  Go beyond monitoring: build into the implementation plan milestones that must be achieved within a specific time frame. It can be done on a monthly or weekly basis.

• Reward success.  
  Find creative ways to motivate people and reward them for their achievements in CSR activity implementation. Establish several positive or negative consequences for achieving or not achieving the progress within the timeline.

Key quotes from interview:  
Two interviewees from logistics department mentioned that “because the scale of this thesis project, the implementation may not be able to monitored effectively, and the progress cannot be measured effectively”

There might be more difficulties and bottlenecks in actual implementation, and not all of those difficulties can be avoided, the management team needs to continuous seek for the solution of making improvements, the guidelines mentioned in this question are just general factors, by paying attention to those factors, the CSR activities implementation should be conducted more smoothly.
4.6 Transportation process redesign

Product architecture assessment

Product architecture assessment can be used to focus advice for product design; it is the basis for applying 3D-CE, normally this model is applied in manufacturing and assembly process, but it also fits the raw material transportation process in CRCC. In this thesis project, the product is the transportation process itself; based on the actual situation of CRCC, the whole raw material transportation process is the main part in total supply chain.

In order to compare the current and the new transportation process, supply chain architecture assessment was made to evaluate and analyze. Based on the theory of product architecture assessment by Fixson (2004), the architecture assessment can be used to coordinate decisions across product, process and supply chain, the advices for transportation process redesign can be provided after the analysis.

Several figures were used to elaborate the architectural characteristics from various perspectives. Since the supply chain architecture assessment takes several steps, it will start with a figure which shows product characteristics impacting design decision in product, process and supply chain domain.

![Figure 4-5 Product characteristics impacting design decision in product, process and supply chain domain](image)

The above figure elaborates the characteristics of the product domain, process domain and the supply chain domain in this case. The product domain decisions are made according to CSR activities, mainly from 4 aspects, stakeholder expectation, technical investment, time period and return on CSR activities. The process domain decisions are made based on features of transportation process, such as new energy consumption plan, new material utilization and staff working condition. The supply chain domain decisions are created with the reference of key elements in supply
chain, which contains vehicle & equipment, sourcing arrangements with suppliers, multi-communication and supervision.

The analysis of product characteristics impacting on design decision would help to identify the most significant focuses during solution-making process. What need to be specially emphasized can be very clear. It would also benefit the later investigations. Function-component matrices are used below to further develop the relationship between function and components.

**Figure 4-6 Function-Components Matrices**

The above matrices show the details of function-components relations. It compares the old transportation process and the new version of that. The two versions have different components. What the components contribute to the functions therefore are correspondingly different. It can be seen that the new transportation process contains very competitive components. ‘1’ is used to present that there is a clear effects between the component and the function. The index 1 is the number of total contributions for each function. The index 2 represents the extents to which this set of components also contributes to other functions. In the next step, two interface matrices are made to clarify and identity the interface information.
The interface matrices for both the old and new version of transportation process are listed above to identify interfaces information. There are four different interactions basically, spatial, energy, information and material. They represent the perspectives of the relationships between two elements. The upper triangles show the interface matrices for the two transportation process. The forms show the reversibility of the interfaces, namely, the effort to reverse or disconnect the interface. It can be seen from the two forms that the interactions among elements in new transportation process are more bi-directional and various than previous transportation process. By adding all the information together, the product architecture map can be generated in the following figure.

**Figure 4-7 Interface matrices for old transportation process**

**Figure 1-8 Interface matrices for new transportation process**
The product architecture map is made to conclude the product architecture assessment. It shows how the functions are related and allocated to the components. Apart from that, it also shows the interface relationships. The map can act as a graphic representation of the full transportation process description. It offers quick visual overview of similarities and differences of product architectures.

This model can be used as a guideline to focus on design decisions critical for product and company under consideration. After adding the new CSR activities into the current transportation process, the new transportation process is more reasonable, it can make the total supply chain operates smoothly; The new transportation process has various updated functions than the current one, the comparison is mainly from 3 aspects, environmental impact, cargo delivery and daily operation. The performance of cargo delivery is almost same; the performance of new transportation process in environmental protection is better than the old one, the new transportation process has less environmental impact than the old one. In the aspect of daily operation, the new transportation process also has a better performance; the efficiency can be improved through adding new CSR activities.

In transportation process redesign, the CSR activities can be classified into different
aspects, such as human resource, operation, cargo delivery, procurement… a table can be made in order to provide a clear view of the possible solutions in transportation process redesign.

**Three-dimensional concurrent engineering (3DCE)** is used. This model focuses on environmental impact. It is the simultaneous design of product, process and supply chain. The new product can be a more environmentally friendly transportation process. Redesigning the current transportation process can appear to be a lesser concern associated with the environmental impacts. This model contains 3 parts, product design, process design and supply chain design. Applying 3DCE requires an operationalization of one of its core elements: the product architecture. As the results obtained from previous analysis, the

Product design
Based on the analysis conducted in product architecture, the transportation process can be updated through various aspects. Based on actual situation of CRCC, the new product can be more environmentally friendly transportation process. The strategies in new product development are:
- Accurate cargo delivery
- High efficiency in logistics service
- Less environmental impact

Process design
The new transportation process should focus on reduce the source of waste. A sustainable process focus may result in improved process consistency, reduced downtime, and lower costs. Recyclable products can lower the user’s disposal costs and lead to designs that allow companies to more readily recover valuable materials, thus the use of recycle products such as recycle paper is a good solution for the company. The key elements in process design:
- Less waiting time
- Innovated vehicle
- Use renewable energy
- Use recycle products
- Reduce specific energy consumption
- Control and reduce pollutant emission

Supply chain design
This part includes environmental supplier evaluation and selection and customer/stakeholder environmental concerns. The supplier of CRCC in transportation process can be the warehouse facility supplier, the company will set out an “supplier selection criteria”, the supplier should meet the requirements in that
criteria
• Supplier selection criteria
• Multi communication
• Inventory control
• Less waiting time
• Customer relationship

Figure 4-10 3D – CE new transportation process

Combine with the data collected through interview, the total transportation process strategy can be achieved through integrating CSR into the value chain; the specific activities are presented in the table below:

<table>
<thead>
<tr>
<th>Value Chain</th>
<th>CSR</th>
<th>CRCC(new transportation process)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm infrastructure</td>
<td>Financial reporting practices</td>
<td>CSR report</td>
</tr>
<tr>
<td></td>
<td>Governance practices</td>
<td>Regular meeting with employees</td>
</tr>
<tr>
<td></td>
<td>Transparency</td>
<td></td>
</tr>
<tr>
<td>Technology development</td>
<td>Product environmental impacts</td>
<td>The use of renewable energy</td>
</tr>
<tr>
<td>Human resource management</td>
<td>Recruiting</td>
<td>Investing in training</td>
</tr>
<tr>
<td></td>
<td>Employee education and job training</td>
<td>Key issue discussion board</td>
</tr>
<tr>
<td></td>
<td>Safe working condition</td>
<td>Labor council</td>
</tr>
</tbody>
</table>

84
<table>
<thead>
<tr>
<th>Operation</th>
<th>Employee benefits</th>
<th>Satisfaction survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emissions and waste</td>
<td>ISO 9001</td>
</tr>
<tr>
<td></td>
<td>Energy and water use</td>
<td>Supplier selection criteria</td>
</tr>
<tr>
<td></td>
<td>Worker safety and labor relations</td>
<td>Energy consumption plan</td>
</tr>
<tr>
<td></td>
<td>Biodiversity and ecological impacts</td>
<td></td>
</tr>
</tbody>
</table>

Table 4-1: Integrate CSR into the value chain

### 4.7 CHAPTER SUMMARY

This chapter presents the research findings based on the research questions. Firstly, the current situation in the raw material transportation process is introduced, then in order to make comparison, the desired situation is analysed, after that the distance between them is clarified, combined with the data collected through interview, the potential CSR activities that can help the company to reach their desired situation and suitable for the raw material transportation are clear. After that the main research question ‘How to integrate CSR activities into the raw material process of CRCC?’ can be answered, the answers for this question is an implementation plan, with the specific action plan to make the CSR activities become realistic, then last question is about the difficulty in implementation.
CHAPTER 5  REFLECTION OF THE RESEARCH FINDING

This chapter relates the findings back to the problem definition by outlining what the implications of the former are for the latter; it discusses how the research findings can be used to solve the problem of CRCC.

The main problem stated in the first chapter was CRCC wants to integrate CSR activities into the domestic raw material transportation process in order to meet the stakeholders’ expectation and to benefit the company in long term. However the company has not got a clear plan about what kind of CSR activities can be integrated and how to integrate the CSR activities into the domestic transportation process in the beginning.

Thus, based on the actual situation of the company, the research questions are mainly from 5 aspects, the first aspect is to investigate the current situation, the second aspect is desired situation, then the research to investigate potential CSR activities that can be used to help the company to reach their desired situation is conducted, it is the basis for formulating the CSR activity implementation plan, then the last part is the potential difficulties in implementation. After the whole research, an implementation plan for CSR activity is finished, it is also the main research question, and it also can provide a solution for the company to solve the current problems in CSR performance.

The whole research finding can be divided into 4 aspects, the current situation of the transportation process, the desired situation of the process, the potential CSR activities that suitable for the transportation, implementation plan and the difficulties in implementation.

As it mentioned, CRCC wants to integrate CSR activities into the domestic raw material transportation process in order to meet the stakeholders’ expectation and to benefit the company in long term, the main problem in problem definition is the company want to have a clear view of how to integrate of implement CSR activity into their raw material transportation process, the research is conducted with the aim of reaching this goal. In order to investigate the suitable CSR activities that fit for the raw material transportation process; firstly the current situation of domestic raw material transportation process regarding to CSR is analysed, the research finding shows clear data about how does the current transportation process work, the steps within the process are analysed step by step, then after having a basic understanding about the process, the problems within the current transportation process is analysed. The data regarding to the current situation are the basis for solving the problems in problem definition. Then, the desired situation is presented, the desired situation is formulated by the data collected through interview, literature review and observation, the data shows that there is still a distance between the current and desired situation,
if the company wants to fulfil the gap, what kind of factors they need to pay attention to, the potential CSR activities are also can be investigated based on those factors. The interviewees also provide a lot of ideas about the potential CSR activities, those advices are also taken into account in listing the potential CSR activities. Finally, the action plan is completed based on the previous research findings, the implementation plan is the core of solving the problems in problem definition. The implementation plan can meet the requirements of the company in achieving better CSR performance in raw material transportation process.

The potential challenges may occur in actual implementation::
There are 3 periods in implementation, short term, mid-term and long term. The short term is 0-10 months; the mid-term period is 10-24 months and the long term is after 24 months. The basic investment should be done in short term; such as the investment in improving working condition, it can lay a foundation and will affect the implantation in long run. Then in mid-term, the key issue can be monitor, after the basic investment, the performance can be improved, then the main task of this period is to monitor the implementation, the aim of doing this is to make sure the whole implementation process is under control. The last period is long term, the key element in long term is the “cost”, to reduce the cost is the key point in long term implementation, to keep pace with sustainable development trend and also to create monetary value at the same time.

“People management” is the biggest problem in any project implementation. In real implementation, the plan may not be implemented completely; the Chinese own interpersonal relationship in state-owned enterprise can influence the implementation, so to restructure the personnel is essential; it is the basis for successful implementation. Since 2009, the Chinese government pays more attention to investigate and to punish unfair administrations in state-owned enterprises; it can benefit CRCC as well. What is more, the costs spend in unqualified staff should be deducted. Personnel restructure can attract attention from current employees, they may concern about their future, such as losing job. The transparency and fairness in actual implementation in Chinese state owned company is always a problem.

Since CRCC is a state-owned enterprise, thus the investment in implementation is not a big problem. As it mentioned, the main cost will be the initial investment. CRCC is one of the biggest tax-payers in China, so the company has close relationship with local government in most of the domestic projects. With the support from local government and enough budgets, the company could implement the implementation plan with meeting less external barriers.

Supervision in implementation is always the key issues in any project. The implementation of new processes requires transparent and sufficient supervision. Especially supervision in the direct related departments and projects, the supervision on employee behaviors is an important concern for CRCC. The engagement of local
government or public can be helpful for CRCC to reduce the pressure of the company in supervisions and achieve a better outcome.
CHAPTER 6 CONCLUSION & RECOMMENDATION

This chapter contains 2 parts, conclusions and recommendations. Conclusions part contains brief summary about main points of this research. Recommendations provide the suggestions to ensure the quality of CSR activity implementation.

6.1 CONCLUSION

The conclusion is based on the entire research; it is a summary of whole research.

In the beginning of this research, the general background about CRCC is presented, it is one of the biggest construction company in China; recently, in order to catch the current market trend, and seek for their own way of sustainable development, but the company does not have a clear view of what kind of CSR activities are suitable for them and how to integrate those CSR activities into the transportation process. Thus the aim of this research is to help the company solve this problem.

The data collected through interview and daily observation shows how does the current transportation process works, as well as the problem within the current process now.

Then combined with the data collected through interview and five stages of corporate maturity, the desired situation in raw material transportation process is defined. Five stages of corporate maturity shows that what is the current performance of the company and which level they can achieve, after the analysis, CRCC can have a clear view of what is the achievable future for them in CSR performance.

After that stakeholder engagement and gap analysis are conducted, the result obtained from using these two methods provide a foundation for formulation the potential CSR activities that can help the company to reach to their desired situation.

The sustainable development planning cycle is used for composing the implementation plan, the CSR activity implementation plan is also based on data collected from previous research.

When the company implement the implementation plan, there must be some difficulties, thus the last part is to investigate the difficulties may occur in implementation, the data of this question is mainly collected through the interview.
6.2 RECOMMENDATION

In order to ensure the quality in implementation, recommendations are provided, those recommendations can be divided into 4 aspects – management, social, stakeholder and environment.

For management aspect.
Management is the most crucial part in implementation, whether the plan can be implemented successfully is mainly depended on the management. The management team should pay attention to strengthen the leadership; the process of implementation should be monitored step by step. The feedback from various stakeholders should be collected weekly or monthly; it allows CRCC to make fast response to the advices from stakeholders. Moreover, it is necessary to make short term implementation review, and then improvements can be made very fast. The management team should promote the thought of "go green", but not set out rules and regulation to restrain the behaviour of employee.

For social aspect.
In order to let the public know the progress of the CSR activity plan implementation, the whole process should be transparent. The CSR activity of CRCC should be published in the official website weekly, by increasing the transparency of the supervision, public can have a platform to know what is going on with the CSR progress of CRCC. Moreover, by cooperating with social media, the company can promote their positive image in CSR performance.

Stakeholder aspect
For a big company like CRCC it is hard to reach out to all stakeholders; the company should try their best to make sure that all of the communications channels are expedite and opened. Moreover, it is necessary to get feedback from various stakeholders in very short term, at least within two weeks. Then based on the feedback from stakeholders, the revision on implementation plan can be made. Sufficient multi communication also allows the company to have a deeper understanding of the needs from stakeholders.

For environmental aspect
Environmental protection is a very sensitive topic in China now, there are many CSR activities in the implementation plan regarding to this field. The participators must be careful about implementing the CSR activity regarding to environmental protection, because to compare with the achievement of company, every little mistake in the field of environmental protection can caused 10 times attraction from public. Moreover, because the sensitivity of environmental protection in China, CRCC can broadcast their public image with a “green tag”, it can be the most powerful way of advertising themselves.
6.3 CHAPTER SUMMARY

This chapter contains two parts; firstly the conclusion is a brief summary of the entirely research, including the whole research process as well as the research findings, how was the research conducted is introduced, the main research steps are mentioned and the key findings are presented in this section as well. The other part of this chapter is recommendation; Recommendations provide the suggestions to ensure the quality of CSR activity implementation, the recommendations are made based on the research results, and mainly from 4 aspects, management, social, environment and stakeholder, the recommendations might can be referenced for the company in actual implementation.
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Appendix A INTERVIEW SUMMARY

Interview summary

<table>
<thead>
<tr>
<th>Factors</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>The current transportation process</td>
<td>Two departments from raw material production place is taking responsibility for the transportation process, the two departments are warehouse department and transportation department. After the information center from raw material production place received the shipment request from domestics project, the transportation process will be started, There are mainly 9 steps in the transportation process, warehouse department is responsible for the step 1234, transportation department is responsible for step 56789</td>
</tr>
</tbody>
</table>
|                                               | 1. Raw material processing  
|                                               | 2. Inventory management  
|                                               | 3. Warehouse department send the transportation request to transportation department  
|                                               | 4. Ready for shipment, wait for material handing  
|                                               | 5. Vehicle scheduling  
|                                               | 6. Cargo loading  
|                                               | 7. In transportation  
|                                               | 8. Arrive at destination  
|                                               | 9. Cargo unloading |

| Key problems within the process              | Working condition in warehouse  
|                                               | Fatigue driving  
|                                               | Energy consumption  
|                                               | Exhaust gas emission  
|                                               | Lack of mutual communication between management team and employee  
|                                               | Satisfaction rate from various stakeholders have not reached the expectation of management team  
|                                               | The dust in loading and unloading raw material  
|                                               | Lack of supervision  
|                                               | The current CSR report regarding to the field of transportation process is not transparent enough |

| The expectation from interviewee             | Better working condition  
|                                               | Multiple communication channels  
|                                               | To switch the total transportation strategy form commercial oriented to CSR strategically  
<p>|                                               | An open platform for all of the stakeholders to express their advices and opinions |</p>
<table>
<thead>
<tr>
<th>Advices about to achieve desired situation (potential CSR activities)</th>
<th>Set up key issue discussion board to solve the urgent requests from various stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conduction satisfaction survey every quarter</td>
</tr>
<tr>
<td></td>
<td>Conduct CSR conference</td>
</tr>
<tr>
<td></td>
<td>Increase the transparency of the supervision</td>
</tr>
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<td></td>
<td>Invite CSR specialists in different fields</td>
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<td></td>
<td>Strengthen the leadership</td>
</tr>
<tr>
<td></td>
<td>Revise and improve the overall strategy of transportation process</td>
</tr>
<tr>
<td></td>
<td>Establish new energy consumption plan</td>
</tr>
<tr>
<td></td>
<td>Discussed supplier related CSR policies at working level and executive meetings on purchasing transportation equipment</td>
</tr>
<tr>
<td></td>
<td>To response fast to the requests from different stakeholders</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential difficulties in implementation</th>
<th>Hard to reach out to all stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unclear progress measurements in CSR activities implementation</td>
</tr>
<tr>
<td></td>
<td>Not easy to monitor or supervise</td>
</tr>
</tbody>
</table>
Appendix B: INTERVIEW TRANSCRIPT

All the interviews were semi-structured interview. As a semi-structured interview the new ideas can be entering during the interview. The research questions were determined before the interview. Because of the character of the semi-structured interview, new questions and discussions were made during the interview; such the interviewee answered the questions which I planned to ask. This kind of interview helps to keep the interview process effective and flexible, the freedom of semi-structured interview could help the interviewee to control the interviews according to different situation, the interviews were filtered, and repeated information was eliminated. The data obtained from interviews were reviewed repeatedly to see if the findings were grounded within the scope of this research. All of the interviews were in Chinese; the translations were made after the interview.

Interview transcript 1
Interviewer: Jessie Lei

CV of the interviewee:
Name: Wang Jun
Position: Project manager of Yangzi River tunnel project
Office address: Yong Hua Road 225, Jin Ling district, Nan Jing, Jiang Su province, China
Interview conducted in manager’s office. The interview was conducted at 4:30 PM on 21st Aug, 2013, Wednesday afternoon.
Methods: Face-to-Face
Place: Nan Jing
Language: Chinese

(Start of Interview)

Interviewer: Can you please introduce your position in CRCC?

Interviewee: I am the project manager of Yangtze River tunnel, it is one of the biggest domestic’s projects of CRCC in 2013, I am responsible for managing the progress of whole project to make the project finish on time as well as with top quality and reasonable profits.

Interviewer: Can you please a little bit about your project?

Interviewee: The project of Yangtze river tunnel has started since 2007, in the
beginning, we met many difficulties, two of the workers were died because of the engineering accident during the subsea operation. It is a hard project in the field of construction.

Interviewer: Can you explain how the current transportation process works in your project does? Such as the main steps within the process.

Interviewee: normally, the raw material production place is responsible for transportation process, we receive the raw material from the raw material production base which also owned by CRCC, for that process firstly the workers in raw material production site processes the raw material, then before we order the lime, it stores in the warehouse near production site, when we need to order the lime, we usually send them a request, after that the workers in raw material production site will prepare the shipment and wait for the material handling, they will also schedule the vehicle, and responsible for the cargo loading, then transport the lime that we need to the warehouse of the construction site of our project.

Interviewer: What are the key problems within the process now? from both management level and environmental

Interviewee: From our perspective, overall, we would like to see a better working condition for the employee in raw material transportation process, because the dust during the transportation can damage the health of employee, it is an unavoidable issue contains in the process. The dust during the transportation is also a problem from the environmental perspective, it is necessary to control the dust in the transportation process. Form management level, currently, energy saving is only stay in the stage of a slogan, there are no relevant regulations or rules about energy saving, as I know, every department still work as their pervious ways of energy using.

Interviewer: How do you feel about the current CSR performance in the transportation process?

Interviewee: In my personal view, we have paid too much attention to promote our positive CSR image to the public, but not as much as to our employee, the working condition still can be improved, the working condition in the warehouse of raw material production site is not as good as I expected, also the energy saving is a problem.

Interviewer: What is your expectation of the CSR performance in the transportation process?

Interviewee: From my point of view, it is better to switch the total transportation
strategy form commercially to strategically in CSR, rules and regulations are necessary, but it is more important to make the thought of "green" into the daily work of our employee. To provide a better working condition for the employee, especially for the workers work in warehouse, to control the dust in raw material loading and during the transportation.

Interviewer: In order to reach to desired situation, several actions needs to be taken, thus do you have any suggestions about what kind of CSR activities can be integrated into the transportation process?

Interviewee: Allowing the employee to have a platform to present their real opinion about the company, their working condition; a key issue discussion board can be the platform. Moreover, labor council also plays an important role in helping employee presenting their real opinions; management level should pay more attention to them. For the environmental impact, the company is considering to import a new automobile exhaust purifier to reduce the exhaust gas emission.

Interviewer: In the actual implementation, there might be some difficulties; do you have any idea of what kind of difficulties might be occurred?
Interviewee: It is not easy to meet the requirements or expectation of all stakeholders, so that the stakeholder engagement can be useful for the actual situation. Moreover, it is also hard to make the implementation process transparency, monitoring is crucial in implementation.
Interview transcript2
Interviewer: Jessie Lei
CV of the interviewee:
Name: Li Zhen Gang
Position: Responsible officer from the lime production site near Yangzi river tunnel project
Office address: Jun Lin Guo Ji 115, Gu Lou district, Nan Jing, Jiang Su province, China

Interview Setting: Interview conducted in the director’s office. The interview was conducted at 12:30 PM on 29th Aug, 2013, Thursday day afternoon.
Methods: Face-to-Face
Place: Nan Jing
Language: Chinese

(Start of Interview)

Interviewer: Can you please introduce your position in the company?

Interviewee: I am a responsible person in the raw material production place of CRCC East China investment branch; we are responsible for supplying raw material to the project like Yangtze River tunnel, as well as other projects, also including the projects not owned by CRCC.

Interviewer: Can you please introduce a little bit about how is the relationship between the raw material production place and the projects?

Interviewee: both the raw material production place of CRCC East China investment branch and most of the projects we are supplying belong to CRCC, the headquarter of CRCC is in Beijing, the headquarter controls all of the branches and projects. Our main responsibility is to supply raw material for the projects near our production place in east china, we are also taking fulling responsibility for raw material transportation.

Interviewer: Can you explain how does the current transportation process worked in your project? Such as the main steps within the process.

Interviewee: As I mentioned, we are taking fully responsibility for the raw material transportation process. Firstly the workers process the raw material after the raw material mined, then the processed raw material stores in the warehouse near production place, after we receive the order inquire, the workers in raw material production place will prepare the shipment and wait for the material handling, the
preparation including vehicle scheduling. The next step is cargo loading, then the raw material will be transported to the destination, the last step is cargo unloading.

Interviewer: What are the key problems within the process now? from both management level and environmental

Interviewee: The dust in material handling, as well as loading and unloading is the biggest problem, it can affect the working condition of the employee in raw material transportation process directly, it can obviously affect the health of worker. And the exhaust gas emission has caused the attention from headquarter recently, some of our competitors are publishing their positive image in the progress of lower the exhaust gas emission, it is also what we need to pay attention to.

Interviewer: How do you feel about the current CSR performance in the transportation process?

Interviewee: Currently, I can see the company really wants to promote a positive image to the public to show that CRCC is a kind of market leader in both commercial performance and CSR performance. Honestly what the company done last year is acceptable by both external and internal stakeholders. But as I mentioned, social performance is enough but the environmental protection part still can be improved, such as to control the dust during the material handling, as well as to lower the exhaust gas emission and energy consumption.

Interviewer: What is your expectation of the CSR performance in the transportation process?

Interviewee: I would like to see a better working condition for the employee, as I mentioned several times, the dust is the main problem for transportation, I was also worked in the warehouse department, so I can empathizing with the feeling of workers. And one more thing about fatigue driving, it caused our attention recent years, we would like to see this kind of problem can be totally avoid in the transportation process.

Interviewer: In order to reach to desired situation, several actions needs to be taken, thus do you have any suggestions about what kind of CSR activities can be integrated into the transportation process?

Interviewee: the company should conduct CSR conference in every 2 or 3 month, to let the public know about what they have done in various fields, such as stakeholder engagement or their achievements in environmental protection.
Interviewer: In the actual implementation, there might be some difficulties, do you have any idea of what kind of difficulties might be occurred?

Interviewee: it might be hard to monitor the progress of implementation, because there are too much participators, as well as to reach out to all of the stakeholders, because ‘people’ is the hardest element to manage.
Interview transcript summary of the warehouse staff
Interviewer: Jessie Lei

The 5 interviews with warehouse staffs were conducted in one day, there were many repeated information obtained from those 5 interviewees, thus only the key elements are translated in this interview transcript.

CV of the interviewee:
Name: Zhang Zi Qiang, Wang Jun Ye, Lin Yong Qing, Li Hong ze,
Position: Warehouse staff in Yang river tunnel
Office address: Pu Kou district, Nan Jing, Jiang Su province, China

Interview Setting: Interview conducted in the warehouse office. The interview was conducted at 13:00 PM, 13:30PM, 14:00Pm, 14:30pm, 15:00PM on 31st Aug, 2013, Thursday day afternoon.
Methods: Face-to-Face
Place: Nan Jing
Language: Chinese

Interviewer: As a warehouse staff you are familiar with the lime transportation process, Can you please introduce how does the current transportation work?

Zhang Zi Qiang: the whole process can be divided into 7 steps; I can draw the transportation process for you (the picture below).

Wang Jun Ye: Firstly the raw material needs to be processed, and then the process material will deliver to the warehouse, after we received the order enquire, we will contact transportation department for vehicle scheduling, then the raw material will be loaded and transported to the required location. The warehouse department take fully responsibility from the raw material handing until the receiving order enquire, then we corporate with transportation department for the vehicle scheduling, the rest steps are responsible by the transportation department.

The answers from rest interviewees were almost same; all of them indicated the similar steps within the transportation process, thus this part only two answers are translated.

Interviewer: What are the key problems within the process now? From your point of view

Lin Yong Qing: We would like to see a better working condition in warehouse; our safety should be ensured.
Li Hong ze: The environmental protection is always a problem, the environment in the surrounding of our production site should be improved.
Shi Jie: The dust in loading and unloading is a problem, as well as the energy
consumption during transportation.
Zhang Zi Qiang: Exhaust gas emission is another problem.
Wang Jun Ye: I don’t know whether the clients are satisfied with the current performance of us, it might be another problem.

Interviewer: How do you feel about the current CSR performance in the transportation process?
Zhang Zi Qiang: It is obvious that the company wants to promote a positive image to the public of their CSR performance. I think what the company done last year is acceptable by both external and internal stakeholders.
Li Yong Qing: The Company did pretty good last year in CSR performance, only the problems I just mentioned.

Interviewer: What is your expectation of the CSR performance in the transportation process?
Wang Jun Ye: My expectation is the company can solve the problems that I mentioned.
Shi Jie: The Company can be the market leader in CSR performance; I would like to be a participator in this moment.

Interviewer: In order to reach to desire situation, several actions needs to be taken, thus do you have any suggestions about what kind of CSR activities can be integrated into the transportation process?
Lin Yong Qing: the company can publish their achievements in CSR performance regularly to let the public know about what they have done in various fields, such as stakeholder engagement or their achievements in environmental protection.
Shi Jie: we can use recycled paper or renewable energy in our department, to use more e-documents but not paper documents.

Interviewer: In the actual implementation, there might be some difficulties, do you have any idea of what kind of difficulties might be occurred?
Zhang Zi Qiang: There are too many participators, it is hard to reach out and manage all of the stakeholders, the mutual communication can be a potential difficulty.
Shi Jie: To monitor the implementation can be a potential difficulty.
Interview transcript summary of the warehouse staff
Interviewer: Jessie Lei

The 5 interviews with warehouse staffs were conducted in one day, there were many repeated information obtained from those 5 interviewees, thus only the key elements are translated in this interview transcript.

CV of the interviewee:
Name: Zhang Yang Bing, Huo Da, Gong Hua Jun, Jin Run Ji, Zhang Hong Liang
Position: Staff from transportation process in Yang river tunnel
Office address: Pu Kou district, Nan Jing, Jiang Su province, China

Interview Setting: Interview conducted in the warehouse office. The interview was conducted at 13:00 PM, 13:30PM, 14:00Pm, 14:30pm, 15:00PM on 2nd Sep, 2013
Methods: Face-to-Face
Place: Nan Jing
Language: Chinese

Interviewer: As a warehouse staff you are familiar with the lime transportation process, Can you please introduce how does the current transportation work?

The answers of this from those interviewees are almost with the answers translated in previous transcripts, all of them indicated the similar steps within the transportation process, thus this part none answers translated.

Interviewer: What are the key problems within the process now? From your point of view

Zhang Yang Bing: We would like to take more training class, to enrich my working experience, it can be helpful if I can learn more about how to handling the emergency situation.
Gong Hua Jun: The dust in loading and unloading is the biggest problem now, it can influence our health, and the working condition should be improved.
Huo da: the energy consumption is another problem, maybe using renewable energy is a solution, in the beginning the cost may be relatively high, but the return of the investment is in long run, it is not only about the profit, but also the reputation of the company.
Zhang Hong Liang: Exhaust gas emission during the transportation is a problem, because the main transportation mode is road transportation now.
Jin Run Ji: the management level doesn't show their strong leadership to this project, I don't think they put 100% effort to this CSR integration project.
Interviewer: How do you feel about the current CSR performance in the transportation process?

Huo Da: After join in UN Global compact, the company has done a great job in CSR performance; they only need to do some minor changes.
Zhang Yang Bing: Currently the company doing well in CSR performance, I even think if they just keep the current performance is okay.
Zhang Hong Liang: If the company can take more care about employee’s welfare I will totally satisfied.

Interviewer: What is your expectation of the CSR performance in the transportation process?

Huo Da: I hope the company can be the market leader in CSR performance; it is not only can benefit the company financially but also good for the reputation in the market.
Zhang Yang Bing: The company is a state owned enterprise, thus the investment in CSR cannot be a problem, if it is possible, the company should try to do more donations.

Interviewer: In order to reach to desire situation, several actions needs to be taken, thus do you have any suggestions about what kind of CSR activities can be integrated into the transportation process?

Zhang Hong Liang: Improve labor relation can be one potential activity, to realize harmonious and stable labor relation.
Huo da: we should use less paper, and recycle efficiency, especially in step of shipment scheduling.
Gong Hua Jun: Maybe we need a stronger leadership in CSR performance
Jin Run Ji: the ability to attract and keep talents is essential for any company; CRCC needs to create an energetic and open environment for talent development, it is also related with CSR, from personnel perspective
Zhang Yang Bing: Eliminate serious accidents in transportation process is another thing we need to pay attention to, training program related to it should be developed.

Interviewer: In the actual implementation, there might be some difficulties; do you have any idea of what kind of difficulties might be occurred?

Huo Da: the time scope is always a problem for any project.
Shi Jie: because of the interpersonal relationship in state-owned company is relatively complex, thus it can be a potential problem in actual implementation.
Appendix C: WORKING DIARY

Location: Yangtze River Tunnel

Department: Transportation/Warehousing Department, CRCC

Date Period: August 19th, 2013 – August 23rd, 2013

Activity: Observation

Description:
The observation was done in a tight schedule. It was because the staff and managers in the two departments were very busy. A tight schedule can help with saving more time and improving effectiveness of the observation. It would help to make the observation done as a complete and clear process. Long and scattered piece of would greatly reduce the integrity and consistency of the information. The observation provides information in site-operations regarding raw material transportation. Together with the data and information from literature as well as interviews, the report could obtain sufficient relevant information in investigations and problem-solving. All the information obtained from observations were recorded in paper.

<table>
<thead>
<tr>
<th>Date</th>
<th>Content of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/08/2013</td>
<td>A. Two types of limes (major raw material) – quick lime and hydrated lime.</td>
</tr>
<tr>
<td></td>
<td>B. Way of quick lime transportation – Road transportation is the major mode of transportation.</td>
</tr>
<tr>
<td></td>
<td>C. Vehicle and equipment – containers, bulk trailer, rail car</td>
</tr>
<tr>
<td></td>
<td>D. The operation of quick lime transportation – from preparations to loading.</td>
</tr>
<tr>
<td>20/08/2013</td>
<td>E. Activities in warehousing department- Receiving raw material, in stock management, shipment scheduling, information centre.</td>
</tr>
<tr>
<td></td>
<td>F. Responsible person for activities in warehousing</td>
</tr>
<tr>
<td></td>
<td>G. Operations of activities in warehousing department</td>
</tr>
<tr>
<td>21/08/2013</td>
<td>H. Responsible person for activities in transportation</td>
</tr>
<tr>
<td></td>
<td>I. The whole process of on-time delivery</td>
</tr>
<tr>
<td>22/08/2013</td>
<td>J. Waste examples in past transportation operations</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>K.</td>
<td>Damages examples in past transportation operations</td>
</tr>
<tr>
<td>L.</td>
<td>Problems that happened in the past warehousing activities</td>
</tr>
<tr>
<td>23/08/2013</td>
<td>M. Environmental effects during the raw material road transportation</td>
</tr>
<tr>
<td></td>
<td>N. Administration and communication during operations</td>
</tr>
</tbody>
</table>

**Conclusions:** Observation during this week was mainly done in the department of warehousing and transportation. Since the key part of whole raw material transportation process contains various internal and external participants, the focus of the observation was in the two departments. The observation was done with corporation of interviews. With the explanation from interviews, results from observation could be better clarified and identified. With the help of observation in the two departments, operation issues, environmental issues, administrative issues could be better described and understood by the researcher.
Location: Beijing, the headquarter of CRCC

Department: Logistics department

Date Period: Sep 23rd, 2013 –Sep 27th, 2013

Activity: Observation

Description:
This working dairy was recorded the observation result in the logistics department of CRCC, just after the internship in Yangzi river tunnel projects. The logistics department belongs management level, headquarter only take reasonability for manage the projects. The raw material transportations are under their control. Together with the data and information from literature as well as interviews, the report could obtain sufficient relevant information in investigations and problem-solving. All the information obtained from observations was recorded in paper.

<table>
<thead>
<tr>
<th>Date</th>
<th>Content of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/09/2013</td>
<td>O. The problems from management perspective of the transportation process</td>
</tr>
<tr>
<td></td>
<td>P. Insufficient leadership in implementation was identified</td>
</tr>
<tr>
<td></td>
<td>Q. Management level wants to integrate the thought of “being green” into employee’s mind</td>
</tr>
<tr>
<td>24/09/2013</td>
<td>R. Operations of activities in logistics department</td>
</tr>
<tr>
<td></td>
<td>S. Review the previous CSR report of CRCC</td>
</tr>
<tr>
<td>25/09/2013</td>
<td>T. Discuss with responsible person of CSR project</td>
</tr>
<tr>
<td></td>
<td>U. Investigate the existing issues within the transportation process</td>
</tr>
<tr>
<td>26/09/2013</td>
<td>V. Review the previous energy consumption plan</td>
</tr>
<tr>
<td></td>
<td>W. Reviewing the accident record in transportation process</td>
</tr>
<tr>
<td></td>
<td>X. Problems that happened in the past</td>
</tr>
<tr>
<td>27/09/2013</td>
<td>Y. Reviewing the past survey records</td>
</tr>
<tr>
<td></td>
<td>Z. Administration and communication during operations</td>
</tr>
</tbody>
</table>

Conclusions: Observation during this week was mainly done in the department of logistics in headquarter of CRCC; logistics department is from management level, which located in Beijing, headquarter is far away from most of the domestics projects. All the domestics’ projects are under their control. The observation was done with
corporation of interviews. With the explanation from interviews, results from observation could be better clarified and identified. With the help of observation in the two departments, operation issues, environmental issues, administrative issues could be better described and understood by the researcher.
Location: Beijing, the headquarter of CRCC

Department: Lime production site


Activity: Observation

Description:
This working dairy was recorded the observation result in the lime production site near Yangzi river tunnel projects. Lime production site is the starting point of whole transportation process. All the information obtained from observations was recorded in paper.

<table>
<thead>
<tr>
<th>Date</th>
<th>Content of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/08/2013</td>
<td>AA. Have a basic understanding of how’s the current transportation process work</td>
</tr>
<tr>
<td></td>
<td>BB. Have a clear view of the working condition in production site</td>
</tr>
<tr>
<td></td>
<td>CC.</td>
</tr>
<tr>
<td>06/08/2013</td>
<td>DD. Operations of activities in production site</td>
</tr>
<tr>
<td></td>
<td>EE. Discuss with the workers in production site, to have a better understanding of the</td>
</tr>
<tr>
<td></td>
<td>transportation process</td>
</tr>
<tr>
<td></td>
<td>FF. Discuss with responsible person in production site, to obtain the information</td>
</tr>
<tr>
<td></td>
<td>provided by management level</td>
</tr>
<tr>
<td>07/08/2013</td>
<td>GG. Investigate the existing issues within the transportation process (the most</td>
</tr>
<tr>
<td></td>
<td>obvious problem is the working conduction)</td>
</tr>
<tr>
<td></td>
<td>HH. Focus on the working conduction, to discuss the problems with workers</td>
</tr>
<tr>
<td>08/08/2013</td>
<td>II. Focus on the working conduction in production site, to discuss the problems with</td>
</tr>
<tr>
<td></td>
<td>workers</td>
</tr>
<tr>
<td></td>
<td>JJ. Reviewing the accident record in production site</td>
</tr>
<tr>
<td></td>
<td>KK. Investigate the surrounding environment near production site</td>
</tr>
<tr>
<td></td>
<td>LL. Review the energy consumption plan last year</td>
</tr>
<tr>
<td>09/08/2013</td>
<td>MM. Review the energy consumption plan</td>
</tr>
<tr>
<td></td>
<td>NN. Communicate with the workers in production site, ask their opinions about the</td>
</tr>
<tr>
<td></td>
<td>environmental protection issue and working conditions</td>
</tr>
</tbody>
</table>

Conclusions: Observation during this week was mainly done in the production site near Yangzi river project; it is the beginning point of whole transportation process, all
the steps in transportation process is equally essential, although the transportation process is not the main part in the process, but it still needs to be investigated. The observation was done with corporation of interviews. With the explanation from interviews, results from observation could be better clarified and identified. With the help of observation in the two departments, operation issues, environmental issues, administrative issues could be better described and understood by the researcher.
Appendix D Data code in template analysis

<table>
<thead>
<tr>
<th>Job Function</th>
<th>Name</th>
<th>Template data code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director in logistics department</td>
<td>Wang Zhi Hua</td>
<td>LDD-1</td>
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<td>Huo Da</td>
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<td>Staff in transportation department</td>
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<td>Liu Jie</td>
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<td>Kang Jun Xiu</td>
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Appendix E Template analysis

1. What is the current performance of the company in domestic raw material transportation process regarding to CSR?
   □ 1.1. The characteristics of raw material transportation process
       WDD, WDC, LDD-1, LDD-2, TD, TDS, RMR-1

   □ 1.2. How does the current transportation process work?
       WS-1, WS-2, WS-3, TDD, TDVS-1, TDVS-2, TDd

   □ 1.3. What are the responsible departments for each step?
       LDD-1, LDD-2, WDD, WDC, TDD

   □ 1.4. The problems within the current transportation process
       PMyzr, PMqa, PMqs3, PMqs5, CE-1, CE-2, LDD-1, LDD-2, WDD, WDC, WS-1, WS-2, WS-3, TDD, TDVs-1, TDVs-2, TDS, TDd

   □ 1.5. The current CSR activities in the transportation process
       PMyzr, PMqa, PMqs3, PMqs5, LDD-1, LDD-2, WDD, TDD

2. What is the desired situation of the company in domestic raw material transportation process regarding to CSR performance?
   □ 2.1. The expectations of various stakeholder groups?
       PMyzr, PMqa, PMqs3, PMqs5, CE-1, CE-2, LDD-1, LDD-2, WDD, WDC, WS-1, WS-2, WS-3, TDD, TDVs-1, TDVs-2, TDS, TDd

   □ 2.2. The desired situations of the company from different factors in CSR performance
       PMyzr, PMqa, PMqs3, PMqs5, LDD-1, LDD-2, WDD, WDC, TDD, TDS

   2.3. The potential CSR activities for CRCC
       PMyzr, PMqa, PMqs3, PMqs5, LDD-1, LDD-2, WDD, WDC, WS-1, WS-2, WS-3, TDD, TDVs-1, TDVs-2, TDS, TDd

   2.4. The gaps between the current and desired situation of the company’s CSR performance
       LDD-1, LDD-2
2.5 The improvements to fill in those gaps
LDD-1, LDD-2

3. How to integrate those new CSR activities into the raw material process of CRCC?
   3.1 What is the action plan of the implementation plan?
       LDD-1, LDD-2
   3.3 Budget for implementation
       LDD-1, LDD-2
   3.4 How to make the future improvements after the implementation?
       PMyzr, PMqa, PMqs3, PMqs5, CE-1, CE-2
   3.5 How to monitor of guarantee the implementation?
       PMyzr, PMqa, PMqs3, PMqs5, LDD-1, LDD-2

4. What are the potential difficulties in implementation? How to control and avoid those difficulties?
   4.1 The common difficulties in CSR plan implementation
       LDD-1, LDD-2
   4.2 The potential difficulties from the perspective of various stakeholders
       PMyzr, PMqa, PMqs3, PMqs5, CE-1, CE-2, LDD-1, LDD-2, WDD, WDC, WS-1, WS-2, WS-3, TDD, TDVs-1, TDVs-2, TDS, TDd