Sustainable development for oil companies: a case study from Thailand

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Abstract

Following growing concern about the negative impacts of industrial development on the environment, notions of sustainable development can be used as a basic framework to maintain development without compromising the quality of the environment for future generations. The complex and dynamic nature of environmental protection and industrial development requires close collaboration between the industry and the wider society. This study examines societal attitudes towards industrial development using Thailand's National Oil Company (PTT) as a case study to understand the complexity of the environmental challenges, the impacts of development and the interaction with management interventions. The study develops a theoretical and practical understanding of sustainable development tools such as environmental management systems (EMSs), public participation and corporate social responsibility (CSR) and how these perform and interact with stakeholders surrounding an industrial complex, largely run by PTT. Findings from the study can be used to improve the performance of the sustainable development tools used by PTT, and more broadly the petroleum industry.

This study was designed to quantify and reveal stakeholders' views on sustainable development tools by employing a mixed methods approach that combines quantitative and qualitative data within a spatial perspective. The results have shown that the local stakeholders' perceptions of the environment and the environmental performance of industry are highly dependent on location. Such information is vital to review environmental performance and develop EMSs. The results suggest that stakeholder analysis is essential for designing the suitable participation methods, which will enhance stakeholder engagement with the environmental information within EMSs and public participation. The findings show the study of stakeholders' expectations of CSR could help in the development of appropriate CSR definition and enhance ensuring CSR performance. The results of this study emphasise the importance of societal attitudes in the improvement of the sustainable development tools. This study has shown that the environmental problems and sustainable development challenges are too complex for a single method to capture. The mixed methods approach used in the study may be applied by an industrial organisation to improve sustainability performances and achieve sustainability objectives of an organisation and enhance the lives of populations that live in areas surrounding industrial plants.

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Finally I would like to dedicate this thesis to my parents, Vinda and Panja Wattanavorakijkul. Without you, I would never have come this far.

Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

1. Introduction

This study examines the perceptions of stakeholders which can be used to improve the performances of sustainability tools (e.g. environmental management system, public participation and corporate social responsibility) in an industrial organisation. In this thesis, a national oil company in Thailand was selected as a case study. The thesis investigates broadly the factors of stakeholder demography; such as location, education and migration background, which could influence their perceptions of industrial-environmental interrelationships. This thesis investigates the relationships between the sustainability tools and local stakeholders' perceptions of the environment and the industrial organisation in the study.

1.1. Background to the study

A sustainable development framework has been recognised as a philosophy that meets the developmental needs of the present generation without compromising the natural resources and environment for future generations (WCED, 1987). Sustainability science encompasses the interconnections between environment and development (Kates et al., 2000; Rao, 2000). The concept of sustainability aims to converge between the environment and development by balancing the three pillars of economics, society and environment (Elkington, 1997). The interrelated dimensions of economics, society and environment are known as Triple Bottom Line (TBL) framework (Tullberg, 2012; Wicks et al., 2012). The collaboration of the three pillars can be viewed as a partnership that enhances the performance of the three pillars; the collaboration among the pillars will help each pillar to maximise its performance and reach goals that none of the pillars could not achieve on their own (Elkington, 1998). The concept of TBL differs from the traditional concept of business that is paying attention to economic concerns but the TBL encourages the business sector to have concerns over environmental and social dimensions (Baker, 2006; Wicks et al., 2012). The number of organisations that adopt the TBL concept is growing at a remarkable rate (Tullberg, 2012). The main purpose of this thesis is to investigate the relationships among the three dimensions of the TBL framework.

The oil industry is one of the extraction industries that have significant impacts on the environment and society (Asif & Muneer, 2007; Block & Whitehead, 2009; Schubert, 2006). The operations of oil companies such as oil refineries, gas processing plants and petrochemical complexes may impact local communities around the operational areas in a number of different ways (Van den Hove et al., 2002). Therefore, this thesis selected a national oil company in Thailand, PTT, as a case study to develop an understanding of the relationships among the three dimensions of the TBL framework (e.g. economics, society and environment). The organisation operates an integrated oil and gas business which covers the entire petroleum and petrochemical industry in the Map Ta Phut (MTP) industrial estate, which is the largest industrial complex in Thailand. In 2009, the Central Administrative Court of Thailand suspended new projects which related to an investment of £4 billion in MTP. Local communities claimed that the operations of oil companies in MTP caused health problems. The question, whether the industrial operations have an impact on the environment and health conditions of the population in MTP, is still under debate.

The adoption of environmental management systems (EMSs), particularly ISO 14001, has been firmly established in Thailand. The country was ranked the fourth among the East Asia and Pacific region for ISO 14001 certification number. Approximately 80% of industrial operational sites in MTP have ISO 14001 certification (Saengsupavanich et al., 2009). The Thai government also encourages industrial organisations in the country to adopt EMS for addressing environmental problems (Tambunlertchai, 2011). Moreover, the Thai government not only promotes the voluntary adoption of EMSs but also promulgates public participation guideline in environmental decision-making process to deal with the environmental problems from the industrialisation in Thailand. The public participation for the environmental decision-making process is required under the Constitution of the Kingdom of Thailand. Based on this, any project that may have a serious impact on the environmental or on health has to study the environmental and health impact assessment, implement a public participation process and receive feedback from an independent organisation (Constitution Commitee, 2007).

The environmental and social problem in MTP is one of challenges that PTT has been facing in recent years (PTT CSR, 2010). PTT, previously the Petroleum Authority of Thailand was established as a state enterprise in 1978 and the organisation was privatised and later named as PTT public company limited in 2001 (PTT Plc, 2014). To minimise environmental and social problems, the Stock Exchange of Thailand (SET) has encouraged the listed companies to embed Corporate Social Responsibility (CSR) in their business strategy (SET, 2013). As a listed company in the SET, PTT has adopted CSR framework in the business strategy of the company to achieve its sustainable development objectives (PTT, 2014). Therefore, this thesis aims to investigate how stakeholders' backgrounds influence on their perceptions which can help to develop the sustainability tools (e.g. EMS, public participation and CSR).

The collaboration among business sector and public sector, such as government, non-governmental organisation and wider society, is necessary to address environmental problems and to achieve sustainable development objectives (UNCED, 1992; UNECE, 1998). Moreover, local communities play an important part in environmental decision-making and sustainable development (UNCED, 1992). However, local communities have less power compared with other groups of public sector in public participation process for environmental decision-making process in many developing countries, such as Thailand (Forsyth, 2007; Kelly et al., 2012). Therefore, this thesis examines the relationships between the sustainability tools (EMS, public participation and CSR) and the local stakeholders. To understand the interrelationship between the case study (PTT) and its local stakeholders in MTP, This study investigates MTP residents' perceptions of the environment in MTP and the residents' expectation of PTT.

An Environmental Management System (EMS) has been recognised as one of sustainability tools for an organisation to manage and minimise environmental impacts from its operations. The EMS is often used by an organisation to improve its environmental performance and operational efficiency (Watson & Emery, 2004). The framework of EMS provides an organisational structure, management system and continuous improvement inside the organisation to enhance environmental performance (Darnall & Edwards, 2006). However, a number of studies have

suggested that the EMS is not an absolute solution (Anton et al., 2004; Barla, 2007; Hertin et al., 2008; Prakash & Potoski, 2011; Rondinelli & Vastag, 2000; Wagner, 2005). Stakeholder groups within the EMS chain include regulator, public and community which all have an important influence for the development of the EMS (Bremmers et al., 2007). These stakeholders may help to address problems and be able to identify solutions in EMS (Reed, 2008). This thesis examines how stakeholders' backgrounds influence their perceptions of the environment to address the problems within EMS.

A public participation is one of the sustainability tools for a commitment to equity and fairness in the Brundtland report (Baker, 2006; WCED, 1987). In the Agenda 21 report, the participatory process was suggested as a political practice to engage and educate stakeholders in decision-making for environmental and natural resources management (Spangenberg et al., 2002; UNCED, 1992). The importance of public participation in decision-making was highlighted again in the Aarhus Convention, which was organised by The United Nations Economic Commission for Europe (UNECE) in 1998. The convention requested the right of public to access environmental information to enhance the successful of public participation (Hartley & Wood, 2005; UNECE, 1998). The public participation in decision-making was emphasised as an important component to achieve sustainability goals (UNCED, 1992; WCED, 1987). Based on this suggestion, the effectiveness of sustainability can be enhanced by strengthening public participation in decision-making (UNECE, 1998). Stakeholder analysis is a process to identify stakeholder and provide crucial information to improve the effectiveness of public participation. This thesis investigates how stakeholders' backgrounds influence their engagement with environmental information and decision-making process.

A Corporate Social Responsibility (CSR) is an initiative for the business sector which is usually referred to sustainable development (Van Marrewijk, 2003). The concept of CSR is a mind-set of business when a company make any decision not only by an economic incentive but also by a social and environmental concern (WBCSD, 1999). The concept of CSR has rapidly gained popularity from the business sector and has been increasingly embedded into a modern business model (Blowfield, 2007). It is believed that CSR policy can drive a sustainable growth in

the business (Crane et al., 2008). However, there is some confusion over the definition of CSR (Dahlsrud, 2008; Matten & Crane, 2005). The misunderstanding of CSR's definition leads to problems in the CSR implementation because the expectations of stakeholders is out of alignment with the business sector (Mellahi et al., 2005; Morsing & Schultz, 2006). Therefore, this thesis aims to investigate the relationships between stakeholders' expectations and CSR.

1.2. Research aims and questions

The aim of this thesis is to investigate how stakeholders' demographic backgrounds influence their perceptions; how such information can be used to develop a better understanding of sustainability tools (e.g. EMS, public participation and CSR). There are three specific research questions sets to answer.

1. How to improve the EMS of the case study by obtaining local stakeholders' perceptions of the environment and the EMS?
    a. Does the spatial context have any influence on the local stakeholders' perceptions of the environmental aspects (air pollution, wastewater, industrial impact and developmental impact)?
    b. How the location of a community influences local stakeholders' perceptions of the environment and the EMS in the area?
2. How to improve stakeholder engagement with environmental public participation?
    a. Does the migration background of stakeholders have any influence on stakeholder engagement in terms of the level of stakeholders' interest in environmental public participation between local and migrant resident in the area?
    b. Does the educational background of stakeholders have any influence on stakeholder engagement in terms of the level of stakeholders' understanding of environmental public participation between higher education group and high school or lower education group?
    c. How other stakeholders' backgrounds (gender and age) influence the stakeholder engagement?

3. How to improve the performance of CSR implementation of the case study and develop a mutual understanding of CSR between the case study and its local stakeholders?
    a. How are differences in the perceptions of CSR between the case study and its local stakeholders in terms of the elements of CSR?
    b. How are differences in the perceptions of CSR between the case study and its local stakeholders in terms of the details of stakeholders' expectation and CSR policy?

By addressing these research questions, this thesis used the mixed methods to quantify the perceptions of local stakeholders and explore deeper details of stakeholders' perceptions and expectations for the purpose of improving the performance of the sustainability tools.

1.3. The outline of the study

This thesis is organised into nine chapters. Chapter 1 provides an overview of the thesis and research questions. Chapter 2 presents a review of related literature on sustainable development, environmental management systems, public participation, and corporate social responsibility. Chapter 3 provides a comprehensive overview of the case study, Thailand's National Oil Company (PTT) and its operations in the Map Ta Phut (MTP) industrial complex. Chapter 4 details the research methodology, the rationale behind the design of research instruments and ethical consideration. This chapter also discussed the mixed method approach and data collection methods used in the thesis including questionnaire, Q-sort, focus group and in-depth interview. Chapter 5 provides the details and results of implementation of the study (pilot study and field study).

Chapter 6 addresses research question 1 and investigates the spatial relationships between stakeholders' spatial backgrounds and their perceptions of the environment. This chapter analyses how the spatial backgrounds of stakeholders influence their perceptions of four environmental aspects; air pollution, wastewater, industrial impact and developmental impact.

Chapter 7 addresses research question 2 and examines how stakeholders' demographic backgrounds influence their engagement with the environmental information in public participation. This chapter investigates the relationships between individual stakeholders' backgrounds (e.g. gender, age, educational and migration background) and the degree of understanding and interest in environmental information.

Chapter 8 addresses research question 3and provides a comparison of the perceptions of CSR between the local stakeholders in MTP and the company, PTT. This chapter investigates the differences between stakeholders' expectations of the company and PTT's CSR policy and activities. The results of this chapter help in the development of CSR definition and the improvement of CSR implementation.

Chapter 9 provides the discussions and conclusion of the preceding chapters and places the findings of this thesis in the wider context of sustainable development. This chapter explains the interrelationship between the implications from the previous chapters. The limitations of the study and future research are also discussed.

2. Literature review

2.1. Introduction

This chapter reviews literature relevant to the study of sustainable development and provides a comprehensive overview of sustainable development tools (e.g. environmental management systems, public participation and corporate social responsibility). The chapter is structured into three main sections which are in line with the major aims of the study.

2.2. Sustainable development

The concept of global sustainability was highlighted in the World Commission on Environment and Development (WCED) in 1987. The result of this convention was the report called Our Common Future, also known as the Brundtland report. This report provided an overview of sustainable development, pointed out the major environmental risks and suggested the potential solutions. The report suggested that sustainable development is required for all mankind, including the principle that future generations have the right to use resources and sustained well-being (WCED, 1987). The United Nation convened the meeting called the Earth Summit in 1992; this raised sustainable development as a topic for preparing the world community into the 21st century. Public participation was mentioned in the UN Conference on Environment and Development (UNCED) called Agenda 21. The main objective of Agenda 21 was to reconcile economics, society and environment (UNCED, 1992). The World Business Council for Sustainable Development (WBCSD) was founded to provide the business voice for the 1992 Earth Summit. The WBCSD believed the business sector plays an important role in sustainable development by promoting corporate social responsibility into the business arena (Baker, 2006).

Sustainable development relates to the environment and development (Kates et al., 2000; Rao, 2000). The needs of humanity have impacted on the natural environment and the ability of the environment to absorb the effects of human development is limited. (Welford & Gouldson, 1993). The concept of sustainable development focuses on meeting the basic needs of humanity for present and future generations

(Kates et al., 2000; WCED, 1987). The concept of sustainable development most frequently referred is the Brundtland commission definition.

"Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

The Brundtland report stressed that the limitation of the environment is linked to economic and social problems in the future. The environmental limitation is imposed by the state of technology and social organisation, but technology and society could improve and bring a new era of sustainable development (WCED, 1987). The vision of development in this report differs from traditional concepts which focus on environmental conservation (Baker, 2006). The report suggested the convergence of environmental protection with economic and social development. A good example of environmental protection convergence is energy security. Petroleum products (gas, oil and coal) are a main energy source, which cause environmental degradation, but green technology (solar cell and wind turbine) and public pressure regarding environmental degradation motivates the substitution of renewable sources (solar and wind). The incorporation of economics, society and environment not only promotes sustainable development but also preserves environmental capital for the future generation (WCED, 1987).

The Brundtland report catalysed the emergence of Environmental Management Systems (EMSs). The report pointed out problems that the environmental institutions need to change about themselves in order to meet the global challenges such as environmental resources, energy and food security.

"The objective of sustainable development and the integrated nature of the global environment/development challenges pose problems for institutions, national and international, that were established on the basis of narrow preoccupations and compartmentalised concerns"(WCED, 1987).

The Brundtland report also required international institutions to strengthen environmental governance (Baker, 2006). The report expected more effective environmental management by encouraging cooperation between environmental

institutions, industrial groups and the public sector. It suggested that environmental institutions should facilitate the involvement of industry, academia and the public in development of planning, decision-making and implementation of EMS (WCED, 1987). As a result, The Brundtland report led to the development of international EMSs in terms of the collaboration between organisations and related stakeholders (Barnes & Hoerber, 2013)

"There is a growing need for effective international cooperation to manage ecological and economic interdependence" (WCED, 1987).

One of the results of the Brundtland report is a greater awareness of global challenges. The report introduced a convergence of the environment and development into sustainable development which considers economic, environmental and social aspects before taking any action (Baker, 2006; Barnes & Hoerber, 2013). International environmental governances have also changed since the Brundtland report with a dramatic improvement in stakeholder collaboration in the international EMSs (Baker, 2006). The concept of the Brundtland commission was reaffirmed at the United Nations Conference on Environment and Development (UNCED) in Earth Summit 1992 (Dooris, 1999; Spangenberg et al., 2002). Output from this conference led to Agenda 21, requesting governments to facilitate public participation in decision-making that impacts on the quality of environment at all levels (Baker, 2006). The report not only stressed the important of public participation to promote sustainable development but also emphasised the integration of economic, social and environmental considerations in decision-making.

"The overall objective is to improve or restructure the decision-making process so that consideration of socio-economic and environmental issues is fully integrated and a broader range of public participation assured.[to improve decision-making process] Ensuring the integration of economic, social and environmental considerations in decision-making at all levels and in all ministries"(UNCED, 1992).

Agenda 21 suggested a close collaboration between local authorities and local communities by balancing economic, social and environmental dimensions at the local scale in order to promote sustainable development (Baker, 2006).

"Local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and sub- national environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development"(UNCED, 1992).

Agenda 21 highlighted the global challenges; energy consumption is one of the most notable concerns in the convention (UNCED, 1992). The main mission of the summit is to reduce greenhouse gas emissions in order to minimise the effect of climate change (Holliday et al., 2002; UNCED, 1992). Therefore, the implementation of Agenda 21 requires the oil and gas industry to take action (Escobar & Vredenburg, 2011). For example, Shell has stated its policy to reduce the greenhouse gas emissions by investing in renewable energy. BP also targets to reduce its global emissions by establishing a solar energy company (Holliday et al., 2002; Skjærseth & Skodvin, 2001). The implementation of the global sustainability policy needs the cooperation of the business sector to complete the objectives of Agenda 21. The World Business Council for Sustainable Development (WBCSD) was established from the 1992 Earth Summit to provide the perspective of the business sector and promote sustainable development in the business arena (Najam, 1999). The WBCSD is a coalition of 200 companies and plays an important role in promoting Corporate Social Responsibility (CSR) into the business sector. The WBCSD requests companies to pay attention to the environment and society. The concept of CSR refers to continuing commitment by companies to operate their business responsibly in relation to all stakeholders (WBCSD, 1999). The WBCSD believes that the promotion of sustainable development into business communities is good for the world and business itself (Baker, 2006).

"To optimize the long-term value of the company to its shareholders business needs to ensure that its values are aligned with the consensus in society. In this way it can

avoid conflict and reap tangible benefits. To do this it has to balance the needs of a range of stakeholders" (WBCSD, 1999).

Business firms have responded to the promotion of sustainable development by adopting CSR initiatives (WBCSD, 2000). The number of companies that implement CSR strategy has risen across the globe (Blowfield, 2007; Crane et al., 2008). CSR has gained popularity in the business sector because it is on a voluntary basis and gives a company a good reputation (Klick, 2009). The concept of CSR, which not only focuses on economic incentive but on concern over environmental and social dimensions, is recognised as a tool for promoting sustainable development throughout the international business community. The greatest challenge that we face is the depletion of global natural resources while the world population continuously increases (UNCED, 1992; WBCSD, 1999; WCED, 1987). Sustainability science is a dynamic concept but a general principle seems to be an emphasis upon balancing of economic, social and environmental dimensions. The triple bottom line (TBL) is a framework that embraces three dimensions of performance: economics, society and environment. The TBL draws a business's attention to social and environmental dimensions (Baker, 2006). The number of company annual reports that have adopted the TBL concept has been rising (Infante et al., 2013).

The impacts of TBL implementation on an organisation's performance can be demonstrated in many ways. For example, IBM implemented energy conservation projects to reduce CO_2 emissions and save energy expenses between 1990 and 2010. These projects avoided 3.6 metric ton of CO_2 emissions and saved $399 million (Willard, 2012). In this case, the resources consumption reduction can not only improve environmental performance but also enhance economic performance. Another example, Hershey, the largest chocolate company in North America, invested in local facilities and created jobs in local scale. These investments had enabled the company to contribute economic development into its operational area and to build mutual interests with local communities, as a result, the company can identify and engage key stakeholders and consequently build understanding and mutual trust with them (Savitz, 2012). From these examples, the concept of TBL and the collaboration among the three dimensions can support each dimension to

enhance the performance and achieve the sustainable development objectives. A number of studies also suggest that the TBL framework should include cultural dimension to engage not only the employees by creating an organisation's culture but also the local communities by learning local cultures (Buckley, 2003; Fry & Slocum Jr, 2008; Savitz, 2012). However, the cultural dimension is difficult to measure and quantify and easy to misunderstand and confuse. Therefore, this thesis focuses on the investigation of the collaboration among the three dimensions.

According to the Brundtland report, the EMSs are recognised as one of sustainability tools to tackle environmental problems (WCED, 1987). The adoption of EMSs has been promoted by governments and international organisations such as World Trade Organisation (Kollman & Prakash, 2002; Watson & Emery, 2004). The EMSs adoption has become normally used in Asian corporations for improving environmental performance, particularly ISO 14001 (Tambunlertchai, 2011). The number of ISO 14001 certifications in The East Asia and Pacific region has been growing rapidly since the standard was first published in 1993. The region was ranked the forth in terms of the number of ISO 14001 certifications with 1583 certifications or 3% of the total certificates in the first year (ISO, 2010). After the two decades of ISO 14001 adoptions, the region has the highest number of ISO 14001 certifications in 2012 with 51% of the total 285,844 certifications (ISO, 2013). Thai authorities promote the adoption of EMS among industrial organisations in Thailand and recognise EMS as a sustainability tool to address environmental problems in Thailand (Tambunlertchai, 2011). As a result, in 2009, Thailand was ranked as the 8th country for ISO 14001 growth in the world, with 930 sites conforming to ISO 14001 standard (ISO, 2010).

Public participation has been recognised as an integral part of sustainable development since the Brundtland report (WCED, 1987). As suggested by the Agenda 21, public participation is an essential tool for environmental decision-making processes (UNCED, 1992). There has been an increase in the number of environmental regulations for public participation in decision-making processes driven by regulatory bodies and governments around the world (Zillman et al., 2002). In Thailand, public participation for decision-making processes is required by the Constitution of the Kingdom of Thailand for sustainable development and

environmental governance objective (Lawyers Council of Thailand, 2007). As stated in the Thai' constitution, any project that may have a serious impact on the environment and health has to implement the public participation (Constitution Commitee, 2007). The concept of CSR is recognised as a tool that can help an organisation to achieve sustainable development objectives (Carroll & Shabana, 2010; Crane et al., 2008; Van Marrewijk, 2003). The number of CSR initiatives in business has been increasing remarkably in recent decades (Blowfield & Murray, 2011; Murray et al., 2010). The WBCSD has promoted CSR initiatives in the business arena and believes that the world will benefit from the promotion (Baker, 2006). In Thailand, the CSR initiatives have been encouraged by the Stock Exchange of Thailand (SET) to minimise the environmental and social impacts from the business sector in Thailand (Chaivorawat & Sayapunt, 2006). Therefore, this thesis investigates the relationships between these sustainability tools (EMS, public participation and CSR) and stakeholders' perception to understand and develop the performance of the sustainability tools of the case study (PTT).

Sustainable livelihoods guideline is another sustainable development framework which is promoted by the Department for International Development (DFID) (Ashley & Carney, 1999; Solesbury, 2003). The concept of the sustainable livelihoods helps in understanding the relationship between poverty and development by considering five capitals (e.g. natural, physical, human, social, and financial capital) (DfID, 1999). Some of capitals such as physical capital (infrastructure and machinery), natural capital (natural resources and environment) and financial capital (cash and debt) are easy to understand, while some capitals, for example, social capital (relationship and trust) and human capital (skill and knowledge) are more complicated (Morse et al., 2009). The TBL framework is suitable for this study because the TBL can provide a better explanation of the relationships among the three sustainability tools (EMS, public participation and CSR). Therefore, the TBL is used in this study as the framework for investigating and explaining how these sustainability tools interact with the local stakeholders surrounding the operational area of the case study.

2.3. Environmental management systems

An Environmental Management System (EMS) is a set of guidelines for an organisation to manage environmental issues within its organisation (Darnall & Edwards, 2006; Marazza et al., 2010). An EMS helps an organisation not only decrease environmental impacts from its operations, but also increase its environmental performances (Johnstone & Labonne, 2009; Marazza et al., 2010). To adopt an EMS, an organisation starts by reviewing its initial environmental gaps and setting up an environmental policy to manage the gaps. The main concept of an EMS is to establish, implement, maintain and improve environmental performance. The four basic elements of an EMS consist of planning, procedure, evaluation and adjustment (Gilbert, 1993; ISO, 2009). These four elements relate to a model of management, also known as the 'plan-do-check-adjust' cycle (Figure 2-1). This continuous improvement cycle of EMS encourages an organisation to continuously improve the performance of its environmental management (ISO, 2004).

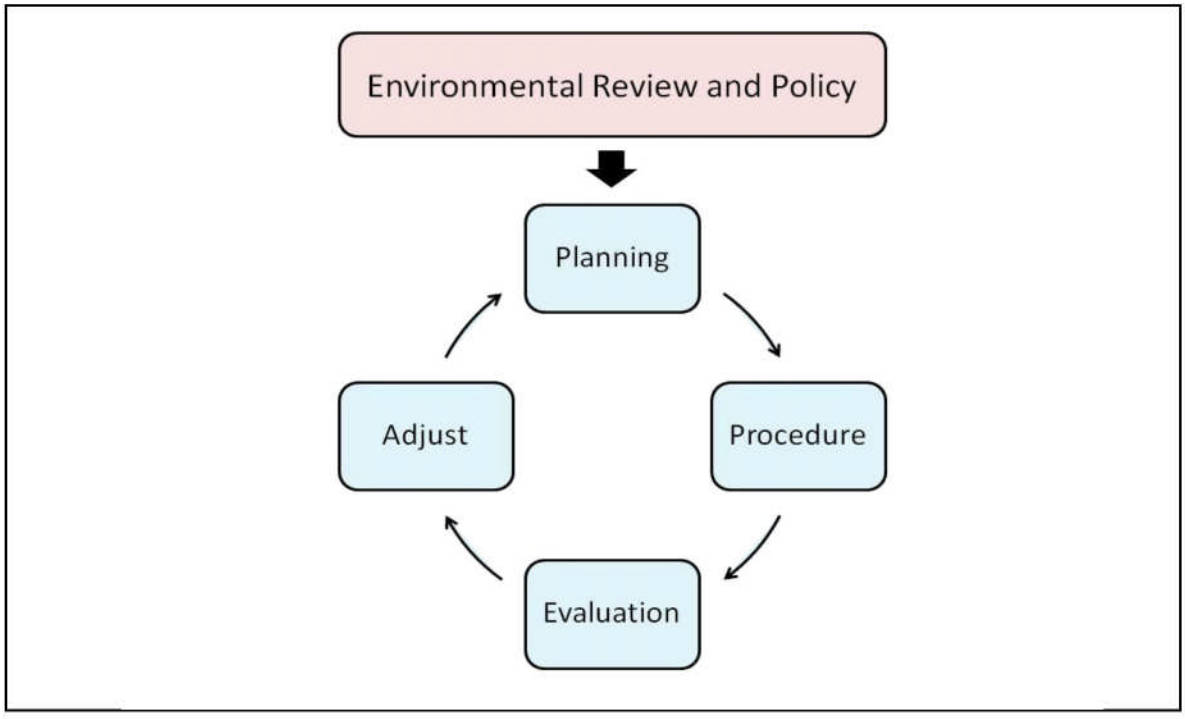

Figure 2-1: Diagram showing the basic elements of an EMS for continuous improvement.

The number of EMS adoptions has been increasing in past decades. However, a considerable number of studies argue that the EMS adoption cannot assure a

consistent improvement of environmental performance (Anton et al., 2004; Barla, 2007; Hertin et al., 2008; Prakash & Potoski, 2011; Wagner, 2005). The argument is that EMSs provide a management system for general environmental impacts but do not focus on any specific industry or type of pollution (Anton et al., 2004). For a successful EMS adoption, an organisation has to adapt its management system to be suitable for its industrial and domestic contexts (Hertin et al., 2008; Prakash & Potoski, 2011). It could be possible that the continuous improvement cycle is not enough to enable a consistent improvement of environmental performance.

From the beginning of 1970s, the concept of environmental protection becomes mainstreamed when the pollution problems were recognised and environmental legislations were established. A command and control approach is recognised as the first step of the EMS, which refers to environmental operating licences that require industry to comply with emission standards such as wastewater standards, air pollution carrying capacity and hazardous waste management. However, organisations can face problems in implementing environmental management because the emission standards can change periodically. As a result, many industrial organisations decided to change their environmental policy from a command and control approach to a self-regulated one. Some companies set their emission targets higher than the government standards and EMS was initially created as a self-regulating environmental management (Nash & Ehrenfeld, 1997; Watson & Emery, 2004; Welford & Gouldson, 1993).

In EU countries, the concept of environmental protection has changed not only due to government environmental policy and new regulations, but has also developed into business firms adopting voluntary practices under environmental standards such as ISO 14001 and EU-Eco management and audit scheme (EMAS) (Giljum et al., 2005; Jordan et al., 2005). The UK Government passed their national environmental legislation as the Environmental Protection Act in 1990 and issued the first British EMS standard (BS 7750) as their national standard two years later. BS 7750, the world's first environmental standard was published in 1992 with a two-year pilot programme in the UK. The European Commission drafted the environmental management schemes in 1990 and published EU EMAS in 1993. ISO 14001 was

launched by the International Organisation for Standardisation in 1996 (Dahlstrom et al., 2003; Delmas, 2002; Hillary, 2004).

In Asia, the ISO 14001 has become the most widely implemented environmental standard by the business sector to address environmental problems. In 2012, the East Asia and Pacific accounted for the largest regional share at 51% of the total ISO 14001 certifications, with Thailand was ranked the fourth in the region in terms of certification numbers after China, Japan and South Korea (ISO, 2013). China was ranked the first in terms of certification numbers with 91,590, followed by Japan (27,774) and South Korea (11,479) and these three countries were ranked as the top ten countries of the world in terms of certification numbers (ISO, 2013). In Thailand, the Thai Industrial Standards Institute (TISI) was established as the national standards body of Thailand and has adopted ISO 14001 as the national standard to promote environmental protection and management for the country (TISI, 2014). In 2012, Thailand had 3,034 ISO 14001 certifications and annual growth rate was 15.6% (ISO, 2013).

ISO 14001 is an environmental guideline, promoted by the International Organisation of Standardisation (ISO). ISO 14001 is totally based on voluntary commitment and not required by regulations, but can enhance reputation (Darnall, 2006). An organisation obtains ISO 14001 certification by regularly summarising a report on environmental performance which is audited by an accredited body. The accredited body must adhere to ISO requirements and periodically be verified by the ISO. The fundamental requirements of ISO 14001 are related to environmental policy, planning, procedures, processes and performance. For instance, the first step is often when senior management announces the organisation's environmental policy, which commits to comply with regulations and intends to improve environmental performance continuously. The organisation prepares practical plans to meet the environmental policy. The execution plans describe resources and delegated persons in any activity; roles and responsibilities are also defined to employees. These plans include communication and training methods to ensure that all employees have awareness, skills and motivation to achieve the organisation's environmental commitment. An organisation must develop processes to evaluate the key environmental performances; top management also must review the

organisation's environmental performances to ensure organisation has a continual improvement (Barla, 2007; Kitazawa & Sarkis, 2000; Rondinelli & Vastag, 2000).

EMAS is an environmental management system which has been promoted by European Commission since 1993. EMAS came from the European Commission's 5th Action programme on the environment. EMAS is a voluntary approach, but a registered company must commit itself to perform an environmental audit and statement by an external auditor (Hens et al., 1999). EMAS seems to be a mandatory standard because EMAS has been adopted by the council of ministers from EU member states. EMAS implementation is related to environmental aspects in stages of policy, review, programme, management system, auditing and statement (Delmas, 2002; Hillary, 1998). The creation of EMAS came from the government representatives of the Council of European Communities which is the environmental ministries of the member states (Krut & Gleckman, 1998). The objective of EMAS is to promote continuous improvement. Participating organisations have to embed an environmental policy into their total operations and review their environmental status. The requirement for EMAS registration is that a company must have a validated initial environmental review and statement to ensure that the environmental performance has been improved continually within a committed period (Hillary, 1995). The process of EMAS certification starts by the participating organisation contacting to an Accreditation Environmental Verifiers (AEV) for verifying its environmental performance and statement. The AEV checks that the organisation complies with the national environmental regulation. Then, the organisation submits its validated environmental statement and applies for EMAS registration. Finally, the environmental authority approves the application and registers the site in the EMAS scheme. The AEV is regulated by the EMAS accreditation body that is responsible for controlling the integrity of verifiers (Delmas, 2002). However, if the site cannot meet the EU conditions, that site will be removed from the EMAS register (Honkasalo, 1998). The credibility of AEVs is important because the environmental performances and statements of a registered company are validated by independent third party AEVs. The integrity of AEVs is guaranteed by the accreditation body (Hillary, 1995).

Critical points of ISO 14001 are that there is no requirement for companies to measure the actual environmental performance and to set specific environmental targets. ISO 14001 assumes that companies comply with regulations, so without measurement, it cannot assure that companies are moving to the continual improvement (Rondinelli & Vastag, 2000). Moreover, ISO 14001 has been criticised because its process relies on certified body companies. Registered companies are usually international organisations. However, their auditors' skills can differ across regions. Therefore, the limitation of credibility depends on the certified company's integrity (Bansal & Bogner, 2002). Another crucial aspect is related to the lack of public access to information; in 1995, the authorities in Denmark voted against ISO 14001 because of this issue. Thus, the Danish government has enacted the legislation that all polluting firms must publish their environmental information. Such a public statement is not a requirement of ISO 14001, unlike another supranational standard such as EMAS (Krut & Gleckman, 1998). It might be possible that many ISO 14001 certified companies have failed in managing their environmental impact because ISO 14001 is just a guideline which does not have the requirement to measure and report publicly the actual environmental performance. Furthermore, the integrity of the ISO 14001 certified body is still doubted by the public and stakeholders. Moreover, the certification process of the EMAS requires details of environmental emissions and impacts; on the other hand, the ISO 14001 certification process checks only the management system (Honkasalo, 1998). It could be possible that a company which obtains ISO 14001 certification might not meet the regulation requirement.

Conversely, within the EMAS scheme, the company's commitment to continuous improvement of environmental performance is a highlighted requirement (Krut & Gleckman, 1998). The company's environmental performances such as emission data or environmental evaluation are followed up by the public via an environmental statement that must be reported in a clear and simple manner which a community is capable of understanding (Honkasalo, 1998). According to the EMAS requirement, the minimum content of an environmental statement must describe the site's activities and provide an assessment of all significant environmental aspects caused by the company's activities. A summary of the significant parameters of pollution emissions such as wastewater, resources consumption and noise pollution must be shown. EMAS demands that the environmental statement is related to environmental

policy and the management system. The statement must provide the deadline of the next statement and the name of the accredited environmental verifier who validated the statement (Hillary, 1995). EMAS encourages organisations to improve their environmental management and performance, whilst ISO 14001 was designed as a guideline for participating organisations to embed into their processes (Morrow & Rondinell, 2002).

There are a considerable number of studies that compare EMAS and ISO 14001. Various authors argue that there is no significant difference between the two EMSs in terms of the company's performance and benefit to business (Glachant et al., 2002; Hillary, 2004). There is no conclusive evidence to show that EMAS is better at inducing continuous improvement than ISO 14001. Operation sites with externally validated EMSs, both EMAS and ISO 14001, tend to have higher levels of operational costs (Dahlstrom et al., 2003). Both standards focus on organisational structures and processes as they are designed but do not concentrate on the tangible results of actions. Thus, the success or failure of the implementation of EMS depends on companies utilising EMS as a useful tool to manage the impacts from their business activities and self-monitoring approach. Otherwise they just gain certifications and are no different from the command and control approach (Freimann & Walther, 2002; Watson & Emery, 2004).

Companies' motivation might be the main factor that shapes and controls the effectiveness of EMS implementation (Morrow & Rondinell, 2002). If a company adopts EMS because of the international supplier qualification, the company needs only the certification to satisfy its customers and might neglect its local communities. On the other hand, if a company is willing to respond to the public pressure from stakeholders or to reduce the risks from environmental legislations, it will lead to significant environmental performance improvement (Bansal & Bogner, 2002; González-Benito & González-Benito, 2005). Industrial organisations might implement their EMS for an international marketing motivation and not for a concern of how their operations impact within their local communities (Bansal & Bogner, 2002). Both ISO 14001 and EMAS are internationally accepted standards (Oluoch-Wauna, 2001). EMAS might be better than ISO 14001 in terms of public statements and procedures to obtain a certification (Del Brío et al., 2001). In the

world of globalisation, EMS is a key to ensure that an industrial organisation complies with an international standard, such as pollution prevention (Delmas, 2002).

EMS has developed for many reasons. First of all, governments believe that EMS would lead industrial firms to environmentally self-regulate and could reduce the workload of government officers (Watson & Emery, 2004). The basic assumption is that when EMSs such as, ISO 14001 or EMAS are embedded in the operation, plants will have better performance or compliance than others without the formal EMS. Thus, government environmental agencies showed interest in the approaches used in EMS, as evidenced by the recent expansion of government voluntary programmes in the United States and Europe that share many features with private standards (Dahlstrom et al., 2003; Nash & Ehrenfeld, 1997). For example, under the Right-to Know Act of 1986 in the United Stated, companies must publish the information of toxic materials inventory. In 1996, firms in Denmark were required to report raw materials consumption and toxic materials in their processes. As a result, some companies decided to reduce their emission by setting an ambitious emission target on a voluntary basis (Nash & Ehrenfeld, 1997). Then, EMS has been promoted by the government to control industry as a self-regulation concept instead of the prior command and control concept (Delmas, 2002). Businesses also need to handle the stricter environmental legislation and lighten the control from regulators (Watson & Emery, 2004).

Second, the rapid growth of public awareness of environmental problems, such as climate change, has placed massive pressures on industry. Stakeholders (customers, investors or environmental advocacy groups) demand industry to reduce their environmental impact and operate its business responsibly. As a result, industrial organisations have improved their environmental behaviour and set the industry's norm to increase public confidence in industry's commitment to environmental protection (Rennings & Ziegler, 2005; Welford & Gouldson, 1993). The pressure from stakeholders is a major influence which motivates industry to pursue EMS certifications (Delmas & Toffel, 2004). Therefore, industrial sectors get involved in the developing of EMS themselves because they intend to meet their stakeholders' expectations and reduce public pressure.

Third, international trade has played an important role in promoting the EMS. Developed countries committed to reducing their domestic emissions, relocate heavy industrial production bases to developing countries through indirect investment (Lovett & Ockwell, 2010). Therefore, each industry has developed codes of practice for implementing among companies in the same industry and business. Moreover, standard organisations provide the international environmental standards and promulgate the EMS adaptation globally. In the era of economic globalisation, the World Trade Organisation (WTO) uses international standards to regulate multinational corporations which grow rapidly. For instance, the international standard, ISO 14001, has been particularly supportive to initiate and encourage the adoption of EMS by WTO (Delmas, 2002; Kollman & Prakash, 2002).

However, EMS might not be a consistently strong driver of environmental performance improvement. This argument is supported by a considerable number of studies in Europe and North America (Barla, 2007; Hertin et al., 2008; Wagner, 2005). The environmental performance analysis of 274 European companies (400 production sites) in five industrial sectors (electricity, fertilisers, paper, printing and textile) found little evidence that certified EMS organisations perform significantly and consistently better than plants without EMS (Hertin et al., 2008). Based on another example from the 37 plants in the Canadian pulp and paper industry, the effectiveness of ISO 14001 was measured, in terms of quality and quantity of wastewater discharge and disposal volume of solid waste, and found to vary across production sites. Some ISO 14001 certificated plants did not lead to a significant improvement of their wastewater effluent metrics for such as BOD and TDS (Barla, 2007). Moreover, the study in environmental and economic performance from four European countries (Germany, Italy, Netherlands and the UK) found that there were insignificant improvements in terms of resources, energy and water, consumption efficiency in production plants with EMS compared to no EMS sites (Wagner, 2005). The research on the intensity of toxic emissions per unit sales (onsite and offsite disposal) from 313 listed companies in the S&P 500, the US stock exchange, found that the EMS adaptation has no statistical association with the reduction of the total toxic emissions per unit sales. Researchers also suggested that EMS has a negative effect on the toxic emission per unit sales. This is because EMS was aimed at general environmental performance improvement but not focused on any specific

type of pollutions (Anton et al., 2004). A study from across 134 countries demonstrated that ISO 14001 is related to reductions in air emissions (sulphur dioxide and carbon dioxide) but not to water pollution (biochemical oxygen demand). ISO 14001 has more impact on sensible air pollution than less sensible pollutants like wastewater because of green-washing motivations (Prakash & Potoski, 2011). Moreover, the adoption of an EMS is not automatically convergent with positive stakeholders' perceptions (Rondinelli & Vastag, 2000). Domestic factors such as local authority and local communities are important in influencing public perceptions of an organisation (Kollman & Prakash, 2002). In addition, the adoption of an EMS is not a panacea to alleviate for the potentially negative impacts of all industrial plants; it is not also assured that the company will attain the overall objective of environmental sustainability (Rondinelli & Vastag, 2000). The involvement of local stakeholders is essential for an industrial organisation to evaluate its environmental performance from an external source (Kollman & Prakash, 2002; Reed, 2008). This study attempts to show that the continuous improvement cycle of EMS is not enough to enable a consistent improvement of environmental performance and the local stakeholders' involvement with the industrial sector is necessary for evaluating the environmental performance and improving the EMS.

2.4. Public Participation

Public participation is required in the decisions that affect the environment because the process can help in promoting stakeholders' involvement and strengthening local democracy (WCED, 1987). According to Agenda 21 chapter 23.2, public participation is an important part of achieving sustainable development and essential for the decision-making process, particularly on environment and development issues (UNCED, 1992). Public participation is a necessary tool, not only for the environmental decision-making process in natural resources management, but also for educating stakeholders to understand environmental problems that can rationalise the decision process (Ploger, 2001). It seems that successful public participation can contribute to a community's acceptance of industrial operations in their "backyard" by a democratic approach (Ebdon & Franklin, 2006; Focht et al., 2012; Ploger, 2001).

There has been an increase in the requirement of public participation in environmental regulations not only at the international level but also at the national level (Zillman et al., 2002). In Thailand, public participation is a requirement to balance the development, environment and quality of life in the country as stated under chapter 5 [Directive Principles of Fundamental State Policies] section 79 of the 1997 Constitution of the Kingdom of Thailand (Constitution Commitee, 1997). Organisations for local participation have been promoted in some countries to improve public participation and influence decision-making, particularly in the energy and environmental field. For example, Germany created a model which has organisations to provide environmental knowledge and opinions for the local people in their decision-making process (Foster, 1980). In Thailand, any project which may seriously affect the environment requires evaluations and opinions from the private environmental organisations and higher education institutions before finalising the decision to start the projects. This regulation was under chapter 3 [rights and liberties of Thai people] section 56 [2] of 1997 The Constitution of the Kingdom of Thailand (Constitution Commitee, 1997).

In 1992, the EIA was introduced in Thailand, as it was required by the Enhancement and Conservation of National Environment Quality Act. Public participation is strictly considered as one of the most important aspects within an EIA report. As stated under section 46[1] of the 1992 Enhancement and Conservation of National Environment Quality, any project which is likely to have any environmental impact is required to study on environmental impact assessment for submission to seek approval (Prime Minister's Office, 1992). The Office of Natural Resources and Environmental Policy and Planning (ONEP) is an authority responsible for examining and approving the EIA report. However, there are many projects that have received EIA approval but did not get acceptance from stakeholders such as the local communities and interested NGOs.

Over recent decades in Thailand, several projects eventually received EIA approval but were delayed or terminated in part because of the public pressure. For instance, the 1400 MW coal-fired power plant in Prachuab Khiri Khan Province, known as the Hin Krut Power Plant, was postponed and finally terminated. The project was terminated because the project developers did not carry out a full and proper public

participation process (Mustanoja, 2002). The EIA report of this project was approved in May 1998 but Hin Krut villagers claimed their right to conserve the natural resources and the environment which is provided by the 1997 constitution of Thailand (Lawyers Council of Thailand, 2007). In January 2002, the Thai prime minister went to the village and collected feedback from local people. As a result, The Thai Government decided to delay the construction of the Hin Krut power plant project in May 2002 (Mustanoja, 2002). The Hin Krut villagers claimed their right to preservation and exploitation of natural resources and the environment in accordance with the section 46 of the 1997 Constitution of Thailand (Lawyers Council of Thailand, 2007). According to the section 46 of the 1997 Constitution of Thailand, the local community has a right to preserve the natural resources and the environment in a balanced manner (Constitution Commitee, 1997). Although the power plant developers tried to change the project's image, it was too late to improve mutual understanding as a result of the inefficient public participation in the early stage, and there was a lack of trust between the Hin Krut villagers and the developers (Chaisomphob et al., 2004). From this case, it might be possible that the public participation process in the Hin Krut Power Plant was not being implemented successfully because of the lack of trust between the local communities and the project developers (Chaisomphob et al., 2004; Mustanoja, 2002). The villagers felt that the project developers evaluated and indicated the potential impacts incorrectly (Chaisomphob et al., 2004). The EIA report not only failed to report the important environment data, such as the number of coral reef and fish, but was also found lacking in a social impact study on the local fishery sector (Chaisomphob et al., 2004; Mustanoja, 2002). The lesson learnt from the Hin Krut case is a good example of the significance to public participation of full and correct information disclosure (Mustanoja, 2002).

The participatory approaches to stakeholder analysis requires a significant investment in terms of the researcher and stakeholders' time, but it is an investment worth making as the both researcher and stakeholders have the capacity to build trust and relationships, uncover potential biases and address areas of misunderstanding (Reed et al., 2009). A number of studies have conducted stakeholder analysis to identify groups of stakeholders in their projects (Dougill et al., 2006; Sovacool, 2010). Dougill *et al.*(2006) produced a list of potential key stakeholder groups from

38,000 residents in the Peak District National Park, England, for evaluating land-use policy options. The study suggested that stakeholder analysis helps in highlighting the key stakeholders and revealing existing relationships among them. Sovacool (2010) conducted stakeholder analysis to identify over 100 relevant stakeholders involved in the Trans-ASEAN Gas Pipeline network from five countries to interview on energy issues within Southeast Asia (e.g. Indonesia, Malaysia, Philippines, Singapore and Thailand). Several attempts have been made to identify stakeholders and manage relationships with them in order to enhance stakeholders' engagement with public participation (Bourne, 2008; Bourne & Walker, 2008; Carver et al., 2001; Rambaldi et al., 2006; Sieber, 2006; Walker et al., 2008). For example, Bourne (2005) suggested a methodology to identify and manage key stakeholders by indicating the scale and scope of stakeholders' influences on the project. These studies applied the method for developing a stakeholder engagement strategy (Bourne, 2008; Bourne & Walker, 2008; Walker et al., 2008). Several studies suggest methods to identify stakeholders and manage relationships with them by integrating Geographic Information Systems (GIS) to plan public participation methods for the stakeholders (Carver et al., 2001; Rambaldi et al., 2006; Sieber, 2006). However, these studies do not consider individual stakeholders' backgrounds and address how these backgrounds influence the stakeholders' engagement.

Heterogeneity of stakeholders' demographic backgrounds is one of the challenges in public participation (Reed, 2008). A number of studies highlight challenges of public participation in the decision-making process resulting from the heterogeneity among stakeholders and suggest stakeholder analysis can help in minimising the effects of heterogeneity on the process (Moran et al., 2008; Prell et al., 2007; Reed et al., 2009; Tippett et al., 2007). Stakeholder analysis is a process to identify and prioritise individuals and groups for involvement in public participation (Prell et al., 2007; Reed, 2008). The United Nations Educational, Scientific and Cultural Organisation (UNESCO) emphasised the importance of environmental education for sustainable development (UNESCO, 2005). Education is important in public participation because a good educational background makes it possible for stakeholders to access and understand environmental problems comprehensively (Breiting, 2009). Education for sustainable development is a main instrument to encourage stakeholders to address the social determinants of environmental

problems (Schnack, 2008; Schusler et al., 2009). Education plays an important role in preparing the stakeholders for democratic action in the public participation process (Lundholm & Plummer, 2010). Furthermore, public participation can be very useful in educating the public about key trade-offs and gaining valuable input from citizens about their priorities and preferences (Ebdon & Franklin, 2006).

However, this study argues that the successful public participation processes have to understand stakeholders' opinions and analyse individual stakeholders' background before implementing public participation process because stakeholder analysis is necessary to design effective methods and techniques for public participation. The Hin Krut power plant in Thailand is a good example of the importance of stakeholder analysis before public participation process. The Hin Krut power plant was terminated because the project did not analyse its stakeholders for designing a proper public participation process at the early stage and consequently there was a lack of trust between the stakeholders and the project (Chaisomphob et al., 2004). The information from stakeholder analysis can provide a better understanding of the stakeholders' heterogeneity and help in designing a suitable technique for public participation (Reed, 2008). Therefore, stakeholders' demographic backgrounds analysis could be useful to enhance stakeholders' engagement with public participation. The stakeholders' engagement with environmental public participation is important for not only EMS implementation but also for the sustainable development initiative (Fraser et al., 2006; Zutshi & Sohal, 2003).

2.5. Corporate Social Responsibility

Corporate Social Responsibility (CSR) is a corporate self-regulation initiative that integrates a continuing commitment to a sustainable development purpose into its business model and policy (Carroll & Shabana, 2010). A successful CSR could not only influence the trust between an organisation and stakeholders but also provide benefits to its business in the long term by improving stakeholders' engagement with the organisation (Porter & Kramer, 2006). Today, CSR is embedded into the core of businesses and is an important part of the overall company's policy (Matten & Moon, 2008; Porter & Kramer, 2006). A company conducts CSR as an instrument to change its business behaviour from making profits for the shareholders to be an

organisation which decides its strategy responsibly in related topics such as stakeholders, environment and human rights (Boasson et al., 2009; Carroll & Shabana, 2010). The theory of CSR has been developed because of the global impacts of many multinational companies which are criticised worldwide for unethical behaviour from their local operations (Scherer & Palazzo, 2008).

In the beginning, an organisation's intention to adopt CSR was not entirely voluntary. Many companies, surprisingly, realised the public pressure on the companies' operations (Porter & Kramer, 2006). The business sector became more concerned about the social and environmental problems caused by their operations and believed that they should be responsible for the impact associated with its operations by mitigating existing and preventing potential problems (Robertson & Nicholson, 1996; Wood, 1991).

In the 1950s, the early conceptualisation of CSR was often referred to as the social responsibility then moved to business ethics and corporate citizenship. Bowen (1953), as cited in Carroll (1999), initially defined CSR as the responsibility of the business for their activities which may perhaps go beyond the company's loss and gain. Friedman (1962), as cited in Davis (1973), pointed out his view on CSR as social responsibilities of the business. This idea guided an organisation into social and ethical common beliefs and legal requirements. The idea of CSR grew continually in its significance and importance during the 1960s – 1970s. As concluded by Carroll (1999), the prior concept of CSR was the businesses' responsibility to make a profit, obey the laws and go beyond these activities. In recent decades CSR has been defined by many organisations, for example, the European Commission defines CSR as below.

"CSR is a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (European Commission, 2006).

It sounds like the view of Bowen that enterprises voluntarily take society and environment into account to make decisions on their businesses and operations.
On the other hand, CSR is defined by the World Business Council for Sustainable Development (WBCSD) as.

"CSR is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as the local community and society at large" (WBCSD, 2000).

Moreover, the World Bank's CSR practice has defined CSR as

"CSR is The commitment of business to contribute to sustainable economic development working with employees, their families, the local community, and society at large to improve their quality of life, in ways that are both good for business and good for development" (The World Bank, 2003).

As mentioned above, CSR could be the objective of organisations that conduct their operations for the sustainable economic development which contributes to their stakeholders' quality of life (employees, communities and society). It also seems that CSR is a convergence of the business responsibility and profit. However, the business sector finds it difficult to integrate CSR into a business strategy because there are too many definitions of CSR (Dahlmann & Brammer, 2011; Dahlsrud, 2008).

CSR is essential for a large organisation which expands its businesses and operations into different countries (Blowfield & Murray, 2011). The concept of CSR is one of the most important strategies for international companies that face cross-cultural difficulties (Mellahi et al., 2005). International companies adopt CSR as a corporate code of conduct to control their local operations and minimise the uncertain risk from local governments (Graafland et al., 2003; Matten & Crane, 2005; Sethi, 2002). However, international companies could have been struggling to implement their CSR policy in different countries (Scherer & Palazzo, 2008). So many different definitions of CSR can create problems for a company to integrate and implement CSR in its operation (Dahlsrud, 2008; Mellahi et al., 2005; Van Marrewijk, 2003). A number of studies suggest that the definitions of CSR depend on the societal expectation of the business sector which can vary according to country and the character of the business (Matten & Moon, 2008; Mellahi et al., 2005; Tokoro, 2007).. For instance, a comparative research on the perceptions of CSR between Europe and the United State has revealed considerable differences between companies on the two continents (Matten & Moon, 2008). Another study which

investigated the definition of CSR has shown that people from different countries perceive the meaning of CSR in different ways. For example, environmental concerns are emphasised in Taiwan, while the empowerment of local communities is the main issue in Ghana (Mellahi et al., 2005).

The number of CSR initiatives has been growing in Asia, however, the number of CSR studies which focus on Asian context relatively little when compared with the studies in U.S and Europe (Chaivorawat & Sayapunt, 2006; Chapple & Moon, 2005). Chapple and Moon (2005) compared CSR policies and activities of top 50 companies in seven Asian countries (India, Indonesia, Malaysia, Philippines, South Korea, Singapore and Thailand) by collecting data and analysing through the information from these companies' websites. The study found significant differences in CSR among these countries in terms of CSR policies and details of CSR activities and concluded that the patterns of CSR are shaped by the relationship between the business sector and society in the country and national norms of the society (Chapple & Moon, 2005). In Thailand, The concept of CSR is relatively new for the business sector. The stock exchange of Thailand (SET) has continually encouraged the CSR initiatives among the list companies since 2004 (SET, 2013). It has been suggested that there is currently no consensus regarding suitable formats and patterns of CSR policies and activities in Thailand (Chaivorawat & Sayapunt, 2006). However, CSR initiative have been of considerable importance in Thailand as the Thai business sector recognised CSR as a major driver of the modern business (Chaivorawat & Sayapunt, 2006; Panthong, 2010).

Companies which are related to natural resource extraction, like the oil and gas business, usually confront public pressure, for instance, Exxon Mobile's local operation involved political corruptions in Indonesia (Taylor, 2004). Under the massive pressure of global trade, the companies' attitude could not be only focused on profit-seeking strategy but should consider an exclusive responsibility for the society both at the domestic and international level (Scherer et al., 2009). Moreover, Shell is under pressure from local protesters in Nigeria where local people feel that international oil companies extract natural resources from their country and have polluted their environment, in exchange for which the economic contribution to society is too small and unacceptable (Livesey, 2001). This phenomenon is

recognised as the 'Resource Curse' or 'The curse of natural resource' (Acosta et al., 2009; Alexeev & Conrad, 2009; Bergesen et al., 2000; Gulbrandsen & Moe, 2005; Sachs & Warner, 2001). A number of studies have shown that the resource-rich countries, particularly oil and gas, have a lower long-term economic growth rate than with resourced-poor countries (Alexeev & Conrad, 2009; Sachs & Warner, 2001). The resource curse is the most popular issue that local people in the host country criticise any mineral extractive company for, which is, not contributing to the development of their country. It usually occurs in the developing countries coupled with high rates of corruption and social inequality (Gulbrandsen & Moe, 2007). Thus, CSR is an indispensable key for oil companies to resolve and avoid the blame for failures in national development. The company seeks to understand and respond to the communities' expectations by adopting and adapting the CSR theory and practice (Genasci & Pray, 2008).

The failure of the CSR programme of the oil companies, such as BP, Exxon and Shell, result from the corporate social initiatives used for public relations purposes, irrespective of their success in fostering the long-term development of a local community (Frynas, 2005). For instance, local people can spontaneously demand obvious amenities such as a school or a hospital, without proper consideration of the economic cost or the long-term benefit. However, schools or hospitals which were constructed by the oil companies lack some basic equipment or staff. Oil companies are not development agencies; they might not be able to achieve all development goals. As a result, there are inherent limitations on the contribution to social initiatives and the benefits that can be made to the greater whole. In short, the similar stakeholder engagement approach would significantly improve the development impact of the CSR agenda (Fox, 2004; Frynas, 2005; Klick, 2009). A number of studies suggest that stakeholder dialogue and analysis can help the business sector to cope with these problems (Kakabadse et al., 2005; Moir, 2001; Morsing & Schultz, 2006; Tokoro, 2007). A company could adjust its CSR policy by communicating with stakeholders in order to satisfy the stakeholders and encourage stakeholders' involvement with the company (Morsing & Schultz, 2006). Therefore, the communication with stakeholders is a cornerstone of CSR because it helps companies know that what the communities really want and design proper CSR programmes for the communities. The dialogues with related stakeholders not only

enhance the effectiveness of CSR policy but also build good relationships between a company and its stakeholders (Tokoro, 2007). A good relationship with stakeholders is important not only for performance of CSR (Pivato et al., 2008; Tokoro, 2007) but also for EMS because it enhances the competitive advantage and reputation of corporation (Bansal & Bogner, 2002; Delmas, 2001). Good relationships between a company and its stakeholders can reduce operational costs and complaints, particularly in project development (Reed et al., 2009; Walker, 2000). Bechtel, an Australian construction company, has strong relationships with residents around its project site; the contractor can implement projects without interruptions in terms of cost and time (Walker, 2000). The management of environmental and social issues of petroleum industry is not purely a cost, but can be of long-term strategic benefit. For a successful CSR implementation, there must be more than corporate policy statements at the headquarters level, (so called "green wash" or green marketing) but rather requires their adoption at all levels of operation (Moser, 2001).

3. The background to the case study: the choice of PTT

3.1. Introduction

This chapter provides a comprehensive overview of the case study (PTT) and the relevant discussions of sustainable development in the broader petroleum industry to put the study into perspective. Section 3.2 reviews the literature that relates to sustainability of oil companies and the case study, PTT. Section 3.3 provides an overview of the focused area, Map Ta Phut (MTP). Section 3.4 considers and discusses the potential causes of conflicts in MTP.

3.2. Sustainability of oil companies: a case study of PTT

The sustainability of oil companies is related to resources consumption and energy supply in the world. The increasing demand for energy has been driven by a growing population and economic growth (Asif & Muneer, 2007; Krewitt et al., 2009). A considerable number of studies found the correlation between energy consumption and economic growth (Laumanns & Reiche, 2004; Lee & Chang, 2008; Ockwell, 2008; Ozturk et al., 2010; Soytas & Sari, 2009). Petroleum products such as coal, oil and gas have been prominent sources of energy for centuries, accounting for 80% of world energy supply (IEA, 2011). Indeed, the promotion of renewable energy is still limited particularly for developing countries because the generation of energy from renewable sources incurs high initial costs and requires high technology (Laumanns & Reiche, 2004). As a result, there has been an increasing global demand for petroleum products. Continued use of petroleum products can lead to environmental degradation, for instance climate change. According to the Intergovernmental Panel on Climate Change (IPCC, 2007), the linear warming trend over the 50 years from 1956 to 2005 showed an increase in average temperature by about 0.13 ºC per decade which is almost double the increase rate of the last century.

An oil company's operations, such as refining, exploration and production, can cause environmental impacts at each stage of production, management and consumption (Asif & Muneer, 2007; Block & Whitehead, 2009). The petroleum industry consists of upstream and downstream processes. The upstream begins from exploration and production of both crude oil and natural gas. Then, the petroleum products are

transported to the downstream processes by oil and gas pipelines or petroleum tankers. The downstream operation includes oil refinery, gas separation, and petrochemical value chain business (Li & Fu, 2011). The refining plant separates the crude oil by fractional distillation to be gasoline, diesel, fuel oil, asphalt and other petroleum products. The process produces air pollutants, for instance volatile organic compounds (VOCs) and carbon dioxide, into the atmosphere (Barregard et al., 2009). The gas separation plant extracts valuable gases, for example, ethane, propane, liquefied petroleum gas (LPG) and impurities in natural gas. Contaminants in natural gas are recognised as air pollutants and hazardous waste such as carbon dioxide, hydrogen sulphide and mercury (Thomas, 2011). The petrochemical industry also emits VOCs, carbon dioxide, and heavy metals into the environment (Li et al., 2009; Tiwari et al., 2010). The petroleum industry affects the environment in many ways. As an example, gas flaring is one of the major common sources of environmental impact. Gas flaring has had a significant influence on climate change and air pollution, with damaged on a local and regional scale. Gas flaring impact assessment is difficult because the temperature of the gas flame can vary from 300 to 1,400 ºC (Frynas, 2000). Gas flaring disturbs nearby communities through thermal impact, noise and vibration pollution. For instance, Nigerian communities suffer from gas flaring as Nigeria produces 25% of all gas flares in the world, causing a significant environmental impact and health hazard, and the Nigerians feel that the gas flares are a major threat (Aghalino, 2009; Benedict, 2011; Van Dessel, 1995). Oil refining is another example of environmental degradation from the petroleum industry. The oil refining requires high energy consumption; 7% to 15% of crude oil is utilised in the processes, depending on the plant's conversion capacity, the grade of crude oils and the quality specification of refined products. The consequence of the energy intensive processes is high CO_2 emissions (Szklo & Schaeffer, 2007). The petroleum refineries in the US account for 20% of the total CO_2 emissions from manufacturing industry. In 2002, the refinery processes emitted 90% of the 304.8 million metric tons of CO_2 emissions produced by the US petroleum industry (EIA, 2005). Governments in many countries, particularly in European Union (EU) nations, target to reduce overall emissions by promoting high fuel standards. The directive of the European Parliament about the quality of petrol and diesel fuels is more stringent. For example, the new specification of maximum sulphur in gasoline is capped to 10 ppm compared to 50, 150, and 500 ppm which was specified by Euro

IV (2005), III (2000), and II (1993) standards respectively (European Commission, 2009). However, practically, the refinery processes to produce higher specification fuels require more energy. As that result, the greenhouse gases emissions from refineries have increased and contributed to the climate change crisis (Szklo & Schaeffer, 2007). This dilemma generates the emission paradox for government action on climate change.

Sustained economic growth and energy security is a core strategy for governments worldwide, particularly developing countries. The petroleum industry, usually operated by oil companies, dominates the world economy. There are five oil companies in list of the top ten world's largest corporations and four companies in the top five (Fortune, 2014). International oil companies (IOCs) such as Royal Dutch Shell, Exxon Mobil and BP had dominated the industry for a long time (Moser, 2001). However, national oil companies (NOCs), for example China's Sinopec group and Brazil's Petrobras, are becoming more powerful in the business. Today, NOCs govern about 90% of world proven oil reserves, increased from 50% in the 1980s (Hartley & Medlock III, 2008).

A considerable number of studies confirm the negative impact on economic growth in a natural resources economy also known as the 'resource curse' (Acosta et al., 2009; Alexeev & Conrad, 2009; Bergesen et al., 2000; Gulbrandsen & Moe, 2005; Sachs & Warner, 2001). The extractive industry, such as petroleum industry, attracts investment from aboard, called foreign direct investment (FDI) (Bridge, 2004). IOCs invest and settle down their operation in the developing country. IOCs such as BP and Royal Dutch Shell in Nigeria explore and produce petroleum products (Mahmud, 2009). The government in resources-owned country receives a massive income from the petroleum resources. However, IOCs earn profit and bring it back to their headquarters which creates imbalances in the host country's economy. The resources curse distorts economic growth in many ways, for example, currency in the country is overvalued (Schubert, 2006; Van der Ploeg, 2011). This phenomenon creates inequality among workers in the industry and the population who are not involved in the resources business. The curse also damages competitiveness with other sectors such as agriculture (Raman & Lipschutz, 2010). NOCs have been emerging because governments attempt to keep the wealth from resources

endowment in their country. Unlike the operation of IOCs, government controls the utilisation of their resource by regulating the NOC's policy. The NOC creates job opportunities and supports human development in the country (Hartley & Medlock III, 2008).

PTT was established in 1978 as Thailand's national oil company, to conduct petroleum and related businesses. The Thai government privatised the company in 2001 and reduced the government's ownership of the company to 66% (PTT Plc, 2014). Currently, PTT is one of the largest corporations in Thailand and ranks as the world's 87th largest corporation in Fortune Global 500 (Fortune, 2014). The operations of PTT are currently recognised as a state-enterprise because the Thai government owns two-thirds majority of the total stock and controls the company as the biggest shareholder by delegating a number of government officers in the board of directors of the company (SET, 2014). The chairman of the board and majority of the board of directors are appointed by the Thai government to direct strategies and future plans of PTT are aligned with government policy in terms of economic contribution and energy security of the country (PTT, 2014). The relationship between PTT and the Thai government as a major shareholder has a significant influence on other roles of government as a regulator. Consequently, it could raise doubt about the transparency and public trust in the company. This thesis omitted to address the relationship between the case study and regulators and focused on the local stakeholders who could bring more problems than the regulators. At present, PTT operates a fully-integrated oil and gas business combining upstream, transmission and downstream operation of petroleum products. The company's operations cover the entire petroleum and petrochemical businesses to ensure the stability of energy sources and drive the economic growth for Thailand (PTT Plc, 2014).

PTT has located its petroleum and petrochemical business in Map Ta Phut (MTP) since 1980s. The company recognises that MTP is the base of its petroleum value chain, from gas separation plants, transmission and distribution pipelines to petrochemical and refinery plants. The petroleum and petrochemical business is the one of the most important parts of PTT's income portfolio. In 2013, PTT registered £1.9 billion net income of which 45% was from the petroleum and petrochemical

business (PTT, 2014). PTT has shown their concerns over the environmental impacts in MTP by investing in the best available technologies (BATs) to mitigate adverse impacts on the environment. For instance, the company applied a sophisticated selective catalytic reduction technology to enhance the removal of nitrogen oxide emission in its newest Gas Separation Plant in MTP (PTT CSR, 2010). However, in 2009, the Central Administrative Court issued an order to suspend 76 projects in MTP which amounted to an investment of £4 billion. Of the 76 projects, 25 were under the PTT group with a total investment value of £2.6 billion. In 2010, PTT included the delays in the project execution in MTP as a top risk in PTT's corporate risk profile.

3.3. Focus area: Map Ta Phut

The Map Ta Phut (MTP) industrial estate is the biggest petroleum and petrochemical complex in Thailand. It is one of the largest petrochemical hubs in the world. The National Economic and Social Development Board (NESDB) of Thailand recorded that the petroleum and petrochemical industry contributed 7.29% of Thailand's Gross Domestic Product (GDP) of £244 billion in 2012 (NESDB, 2013). The contribution of the petroleum and petrochemical business in 2009 was 6.92% of Thailand's GDP of £191 billion. The contribution dropped by 4.08%, compared to the petroleum and petrochemical industry proportion in 2008. The petroleum and petrochemical sector generated about 7.56% and 7.15% of Thailand's GDP which was around £180 and £193 billion in 2007 and 2008 (NESDB, 2010). It could be possible that the environmental conflict in MTP was one of the major causes of the decline in the Thai economy.

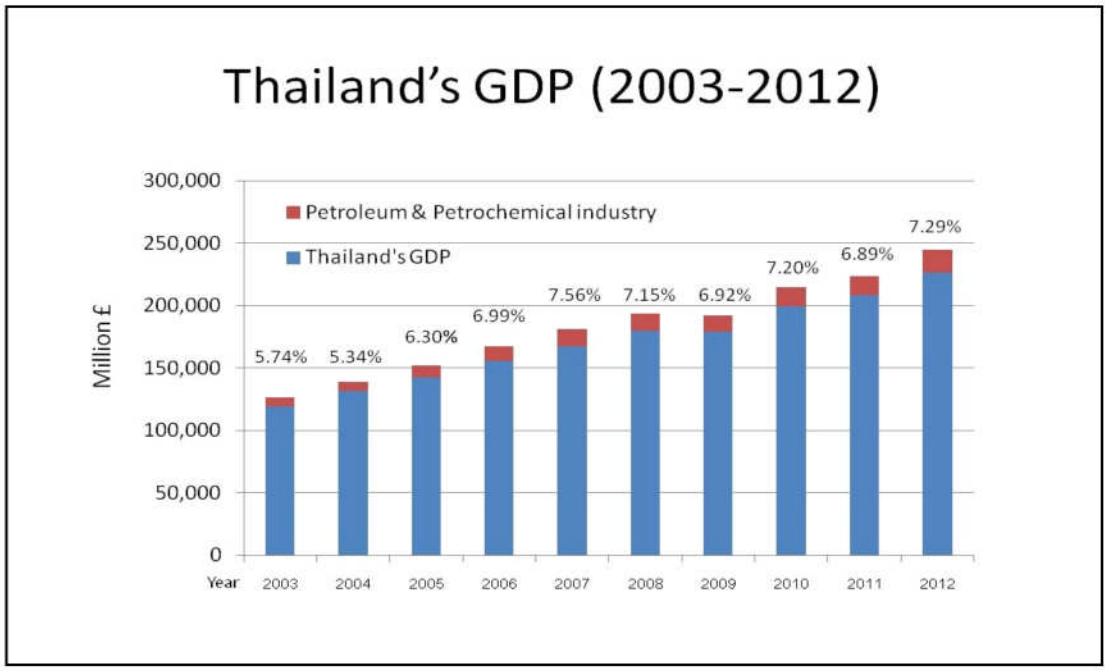

Figure 3-1: Thailand's GDP and the economic contribution of the Petroleum and Petrochemical industry to the Thai economy.

The MTP district, in Rayong province, is a part of Thailand's Eastern Seaboard Development Programme. The Eastern Seaboard Development Plan (ESDP) is a comprehensive regional development plan covering three provinces: Chachoengsao, Chonburi and Rayong. In 1981 the National Economic and Social Development Board (NESDB) of Thailand, with the Prime Minister serving as a chairman, decided to promote the eastern provinces in the Fifth National Economic and Social Development plan (1982 – 1986). One of the NESDB aims was to ensure that the development of the eastern part of Thailand assisted in a decentralised policy to diffuse growth away from the capital, creating an alternative industrial base beside Bangkok. The eastern region was responsible for 13.4 % of Thailand's Gross Domestic Product (GDP) in 1979. This region grew at an annual rate of 12.4 % during 1975 – 1979, largely from the industrial sector which accounted for 30.8 % of Gross Regional Product. The ESDP is considered one of the most developed regions, mainly because of locational advantages: it is not very far from Bangkok, it is well connected to an abundant labour source from the northeast region, and it is connected to the Gulf of Thailand, the main gateway for international trade. In terms of the infrastructure, logistical networks such as deep-sea ports, railway lines, and an extensive road network are all well developed within the ESDP (NESDB, 1981).

The ESDP is recognised as a leading area for driving the enhancement of manufacturing structure to shift from agriculture to industrial products (Shimomura, 2000). The NESDB selected two districts as sites for industrial estate development, Laem Chabang and MTP. As shown in Figure 3-2, Laem Chabang industrial estate is located on the western coast of Chonburi province and has been developed as the centre for export-oriented and light industries. "Light industries" are defined as an industrial section which processes non-metallic substances such as food and textiles to produce consumable goods relatively light in weight (NESDB, 1981). While, the MTP district has become a hub of heavy chemical industries: petrochemical, chemical fertilizer, soda ash, and deoxidized steel (sponge iron). Today, the MTP industrial complex is solely centred on the petrochemical industry, utilising natural gas from the Gulf of Thailand (JICA, 1999; Kuchiki, 2010; Muto et al., 2007; NESDB, 1981; Shimomura, 2000).

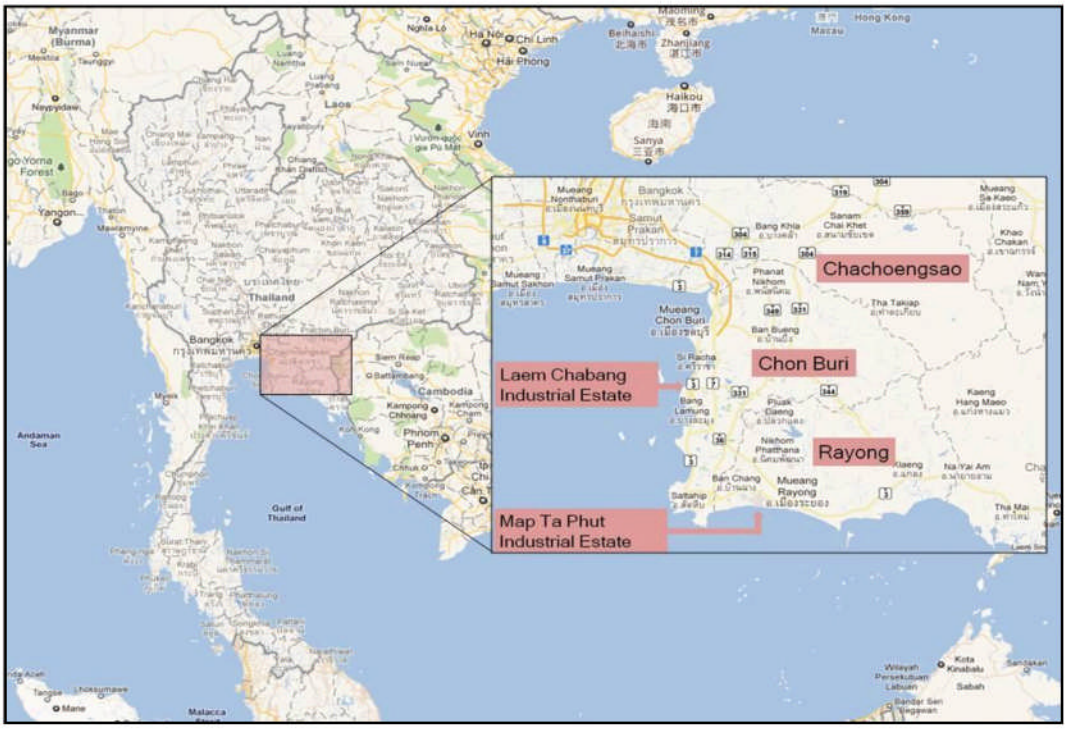

Figure 3-2: Map showing the location of Eastern Seaboard Development Programme (ESDP) that consists of two industrial estates, Leam Chabang and Map Ta Phut, across three provinces (e.g. Chachoengsao, Chon Buri and Rayong).

In 1973, natural gas was discovered in the Gulf of Thailand. The Thai government decided to promote the development of a natural gas industry (NESDB, 1981). PTT, previously the Petroleum Authority of Thailand, was responsible for the construction of the transmission pipeline from the first production gas field (Erawan) in the Gulf of Thailand to come ashore at MTP in Rayong. The pipeline laid extended to the Bangpakong and South Bangkok Power Plants of the Electricity Generating Authority of Thailand (PTT Plc, 2014). The composition of gas from the Gulf of Thailand consists of various valuable hydrocarbon components, such as ethane, propane and butane, which can be extracted into many high-valued products (Ariga & Ejima, 2000). Thus, the first gas separation plant was constructed in MTP in 1982 and completed to produce feedstock: ethane, propane and LPG in 1984. The first phase of the petrochemical complex started by the National Petrochemical Company (NPC) was founded in the same year (JICA, 1999). However, the ESDP was delayed due to Thailand's economic problems, current account deficit and foreign debt expansion. After a reassessment process, the Thai government decided to restart the Laem Chabang area in 1986 and MTP industrial complex in 1987 (Shimomura, 2000). The NPC plant (phase 1) construction was completed and became commercially active in 1990, forming the start of the petrochemical industry in Thailand. The primary objective of NPC was to manufacture raw ethylene and propylene from ethane and propane which are fundamental materials in the petrochemical industry (Muto et al., 2007; PTTCH Plc, 2011; Watanabe, 2003). Over the past three decades that the ESDP has been deployed, the eastern region has changed to be an industrialised area. The ESDP is very important for the Thai economy. Referring to the NESDB (2011), the Gross Regional Product (GRP) of the eastern was second largest after Bangkok, sharing 16.1%, 15.8% and 12.7% of GDP in 2010, 2005 and 2000 respectively. Focused on the manufacturing sector, the eastern region contributed 22.5%, 22.9% and 17.8% in 2010, 2005 and 2000 respectively.

The MTP as a part of the ESDP has grown into one of the world's biggest petrochemical hubs. There are five gas separation plants and 58 large industrial factories which include a variety of petrochemical and refinery plants. The Ministry of Commerce (2010) reported that Thailand exports 30% of its total petrochemical products production capacity. The rest is used for domestic consumption in other

industries such as automotive, electronics and packaging. In 2010, the total value of exported petrochemical and petroleum products was £8.5 billion, which accounted for 6.9% of the total export value of Thailand (Ministry of Commerce, 2011). The petrochemical industry supports 200,000 jobs and more than 1.2 million positions in related industries (Ministry of Commerce, 2010). Furthermore, Rayong had the highest Gross Provincial Product (GPP) per capita in Thailand (£21,052) in 2010, some three times that of Bangkok (£7,312). The GPP per capita in Rayong grew remarkably from 1980, some 49 times compared to 2010. The large proportion of GPP, 43.7%, in Rayong came from the manufacturing sector (NESDB, 2011). Thus, MTP has developed to be a gigantic industrial complex and generates a massive income for Thailand. As a developing country, Thailand is likely to enjoy many decades of extensive economic growth in several sectors. However, there has been environmental impact at the local, regional and national level which will be discussed in the next section.

3.4. Conflicts in Map Ta Phut

The industrial sector has become a main part of the Thai economy. As the industrial sector grows, it leads the Thai government into environmental conflict with the country's environmentalists as well as the wider population (Forsyth, 2007; Tambunlertchai, 2011). The investors' confidence, particularly those from aboard, was dented by the suspension in 2009. Thus, it impacted directly on Thailand's attractiveness to foreign direct investment (FDI) (Nidhiprabha, 2010). Thailand's FDI dramatically dropped in 2009 by £3.3 billion, 41% decreased from £5.6 billion in 2008 (Bank of Thailand, 2011). Thai government received tensions from investors, particularly Japanese who invested 37.8% of total FDI in 2008 (Bank of Thailand, 2011; Komachi, 2010). The government was also under pressure from the public; thus, the Thai government was in a dilemma of trying to sustain GDP growth for economic stimulation while dealing with concerns over environmental issues in order to promote political support.

The court injunction order was the result of action by local communities who lived in the MTP area. They claimed that the existing plants were having cumulative health impacts on the local populations and the industrial sector could not reassure the local

people that the proposed projects would not have further negative impacts on their quality of life (Charoensin-o-larn, 2010). The injunction order was issued despite all the new production unit projects having passed Environment Impact Assessment (EIA) reports which were conducted by the Office of Natural Resources and Environmental Policy and Planning (ONEP). The suspension not only represented a partial victory for the local community but also discredited the existing plants at MTP. The question was raised whether the currently operational plants were of an adequate environmental standard in terms of operation and compliance with regulations. The assumption is that the latest projects, incorporating the most modern design, safety and environmental sustainability features, had failed to assure the public that these projects would not cause negative health impact to residents. In this case, the EIA reports did not meet the requirement according to the 2007 Constitution of Thailand which related to public participation process.

Indeed, unsuccessful public participation causes more negative effects on the project developers and can result in the delay of project implementation. It might lead to legal conflict and crisis, for example, in the case of Hin Krut Power Plant. The Hin Krut power plant project struggled with the public participation requirement in 1997 The Constitution of the Kingdom of Thailand, while projects in MTP have problems with the Constitution of the Kingdom of Thailand enacted in 2007. This obstruction became a cause of the crisis in MTP a few years after 2007. The local people claimed that the projects in MTP did not meet the requirement under section 67[2] of 2007 The Constitution of the Kingdom of Thailand, which stated that any project that may have a serious impact on the environmental or on health has to study the environmental and health impact assessment, implement a public participation process and receive feedback from an independent organisation (Constitution Commitee, 2007). As consequence, all the permissions, construction and operating licences were rendered illegal. The significant differences between the 1997 and the 2007 Constitution of the Kingdom of Thailand are the health impact assessment (HIA) report and public consulting process. The MTP protesters stressed these areas as the main reason for suspending projects in MTP. They did not only raise their arguments in the public debates but also brought these issues to the Administrative Court, whilst the project developers claimed that there was no guideline to study the HIA report and to implement public consulting process for these projects at that time

and their project's permissions were still effective. In fact, all new projects in other areas which were developed after the 2007 Constitution of the Kingdom of Thailand did not study the HIA report nor implement public consultation; these issues were pointed out only in the MTP area. It might be possible that the conflict in MTP is chronic and the public participation processes for new projects in MTP are not suitable.

As highlighted by Gouldson (2004), one problem many stakeholders face is the inability, both in terms of gathering and analysing credible evidence, to effectively question regulatory decisions. As a result, the legitimacy of many regulatory decisions has been challenged and there are recurrent calls for the stakeholder to be given the right both to participate in the decision-making process and to scrutinise its outcomes. In the case of MTP, it could be that the industry runs their existing operations to high standards and entirely within accordance of existing regulations, but, even if this is the case, their credibility with local communities is in doubt. Given the injunction order it is clear that people are currently unaware of this because they do not receive or have access to, or do not have the detailed knowledge required to understand, the relevant information. This represents a failure of business and legislation to communicate to stakeholders or to effectively enable them to engage and participate in the process.

Although the adoption of ISO 14001 has been firmly established in Thailand, the environmental degradation problem is still one of the major challenges for the country. Environmental management by the industrial sector in MTP was challenged by the public, even though their operations conformed to international environmental management standards such as ISO 14001. Ironically, although 80% of industrial operators in MTP acquired ISO 14001 certificates, the number of complaints has been increasing, implying that the relationship between companies and communities has been getting worse (Saengsupavanich et al., 2009). The question is whether there are problems in implementing the Environmental Management Systems (EMS) in Thailand or not. Some authors argue that organisations, which adopt EMS just for certification or business competitiveness, focus on the need to comply with international standards and do not concern themselves with important domestic demands. Organisations which are not motivated to improve their environmental

performance may not embed the EMS into their operational practices (Azzone et al., 1997; Kollman & Prakash, 2002).

It could be possible that EMS, such as ISO 14001, has been implemented poorly in MTP or Thailand. A small number of studies have concluded that plants in MTP have EIA follow-up programmes and CSR implementation which provide not only for public involvement but also operational efficiency and environmental protection (Chaivorawat & Sayapunt, 2006; Morrison-Saunders et al., 2001; Panthong, 2010). However, a considerable amount of research has also supported the local communities' claims. For example, there is growing evidence that air emissions from plants lead to impacts on health, such as respiratory disease and cancer, in the MTP residents (Aungudornpukdee & Vichit-Vadakan, 2009; Jadsri et al., 2006; Uapipatanakul, 2009). Air emissions from MTP are a complex mixture of air pollutants; one of the most prominent types of air pollution in MTP is volatile organic compounds (VOCs), such as Benzene, Toluene and Xylene, which can cause serious health effects through toxic, carcinogenic or mutagenic actions. There has been evidence to claim that Benzene, one VOC species, is a human carcinogen (Peluso et al., 2008; Pimpisut et al., 2005; Sangrajang, 2008). Referring to cancer rates in Thailand from the Ministry of Public Health (2010), the age-standardised incidence rate (ASR) of cancer in Rayong is the third highest in males (197.1) and the forth in females (163.7) from thirteen focus areas in Thailand. The age-standardised incidence rate (ASR) is a summary measure of a rate that a population will have if it has a standard age structure. Lung cancer rate in Rayong is especially high with an ASR of 36 (male) and 13.9 (female) compared with the Thai average of 24.9 in men and 9.7 in women. This has led some to make a link between MTP residents' health impacts, especially respiratory problems, to air pollution and industrial development in the Rayong area. However, the cancer data from the Ministry of Public Health represents the incidence rate in overall Rayong, but not specific to MTP. The cancer rate which focuses on the MTP area has not been reported. To summarise, the cumulative impacts from the development in MTP ignited a crisis which relates to the environmental issues of this area and the economic growth of the country.

4. Methodology

This chapter outlines the details of a mixed methods approach and research instruments used in the thesis including questionnaire, Q-sort, focus group and in-depth interviews. The chapter also provides information of ethical considerations.

4.1. The mixed methods approach

The mixed methods approach, a combination of quantitative and qualitative approaches, is used in this study to explore societal perception (Hesse-Biber & Leavy, 2010). A fundamental assumption about a mixed methods approach is that quantitative and qualitative methods can complement each other and that they provide broader and more credible understanding of research problems (Tashakkori & Teddlie, 2010). A number of social science researchers suggest that societal perceptions are too complex for a conventional single method to capture and recognise, therefore, the mixed methods can be used as an alternative approach to investigate social phenomena (Bazeley, 2012; Bryman, 2006; Marti & Mertens, 2014).

The purpose of the mixed methods approach is not to replace either the quantitative or qualitative approach. However, the mixed methods approach maximises strengths and minimises weaknesses of the quantitative and qualitative approaches that have been criticised for their limitations. As the details of social phenomena cannot be explained by numerical data and statistical techniques, quantitative results are limited as these results can fail to capture the dynamic nature of the data in social science and to investigate sophisticated characteristics of human perception. On the other hand, a qualitative approach provides insights into human perceptions. The qualitative data is descriptive and informative and is believed to help the researchers gain an understanding of underlying reasons of human behaviour from the participant's perspective. However, the qualitative approach has been criticised by academic researchers for its subjective and selective reporting of results instead of providing accurate information.

Triangulation is one of several benefits from the mixed method approach and the triangulation offers the advantages of validity and reliability in the social science

research (Bryman, 2006). The triangulation can help confirm or deny findings of one method against another. For example, questionnaire is used to gather information, but it is likely to be based on self-report. Focus group can be used to confirm what the participants' perceptions by observing their comments and reactions among other participants in the focus group. There are four types of triangular as below: (Data, Methodology, Theory and Researcher)

- Data: this involves the use of variety of data sources in a research.
- Methodology: this involves the use of multiple methods to investigate a research problem.
- Theory: this involves the use of multiple perspectives and theories to interpret the results of a research.
- Researcher: this involves the use of different researchers.

Although this thesis was not aimed at triangulation, the data and methodology of triangulation were in used to validate the findings of this thesis. In this study, both quantitative and qualitative approaches were used to facilitate the comparison of the findings. For the quantitative part, this study collected quantitative data from questionnaire (nine-point Likert scale) which was analysed by t-test and regression. While for the qualitative part, the data from focus groups and interviews was analysed by a qualitative method (thematic analysis). This study quantified the perceptions of MTP residents from the questionnaire data to compare their perceptions by statistical techniques. The qualitative data from focus groups and interviews helped not only to add the depth and understanding of the questionnaire data but also to validate the findings from the quantitative analysis.

4.2. Research instruments

A mixed methods approach is useful for assessing descriptive data of stakeholders' attitudes, concerns, interests, preferences and perceptions (Bryman, 2006; Creswell, 2012; Robson, 2011). This study involves collecting data in order to answer the research questions concerning stakeholders' perceptions. The study was based on an assumption that the perceptions of local stakeholders surrounding industrial operations are important to improve the sustainable development tools:

environmental management system (EMS), public participation and corporate social responsibility (CSR). The systematic and descriptive data in this study were collected through four research instruments: questionnaires, Q-sort, focus groups and in-depth interviews. This section describes the research instruments used to gather data.

4.2.1. Questionnaire used in quantifying local stakeholders' perceptions

The aim of using questionnaire in this study was to investigate and quantify the MTP residents' perceptions of sustainable development tools. Participants in the questionnaire survey were the residents around the industrial estate in Map Ta Phut (MTP). A questionnaire is a research instrument which has a larger sample size and lower cost compared to other research instruments (Robson, 2011; Singh, 2007). In this study the nine-point Likert scale format, ranging from 9 (very important) to 1 (not important) was used in the questionnaire. According to the results of the pilot study, the nine-point Likert scale is suitable because the scale is not too difficult for the participant to express their perceptions. Moreover, the nine-point Likert scale has equal intervals enough to perform closely as a scale that can be analysed by parametric methods, while five-point or seven-point Likert scale may not have equal intervals enough to be perceived as a scale (Singh, 2007). The questionnaire had five sections (I-V) (Appendix III). The sequence of questions is important in designing the questionnaire. The first section should be clear and easy to answer such as background information, this was then followed by questions from general and less difficult ones towards more specific and more difficult questions (Singh, 2007).

Section I gathered residents' background information such as age, gender, educational level, community and living duration in MTP. The section sought demographic background information for analysis on whether the stakeholders' demographic background plays a role in shaping their perceptions of the sustainable development tools or not.

Section II gathered information about the aspects that residents perceive to be important to their quality of life. The data collected from this section of the

questionnaire was used to answer the research question about CSR: what dimensions that the MTP residents perceive as the main elements of CSR.

Section III collected information about perception about the environment and EMS in MTP. The section focused on residents' attitudes and concerns about environmental problems in MTP. The data collected from the section helped to understand how the location of a community influences the residents' perceptions of EMS.

Section IV collected information to answer the research question about public participation. The focus was on residents' engagement with environmental information. Participants were asked about their interest and understanding of environmental information. The data collected from this section was used to answer how residents' demographic backgrounds influence their engagement with environmental information.

Section V collected information about residents' attitudes on CSR and their expectation of the industrial sector. The data collected from this section was used to understand what dimensions that the MTP residents perceive as the main elements of CSR.

The purpose of the questionnaire was to quantify the MTP residents' perceptions of the quality of the environment and environmental performance in MTP and the level of understanding and interest in environmental public participation. The questionnaire participant recruitment was done by using a mixture of cluster and snowball sampling to help in randomising the participants. The questionnaire data were analysed by a statistical programme (IBM SPSS statistics 19). Quantitative data from the questionnaire survey were used to investigate statistical differences in residents' perceptions between two groups of residents from different backgrounds. Differences in responses of participants were compared by independent samples t-tests responded to a hypothesis testing. The independent sample t-test method which was selected to compare participants' perception was based on the following assumptions (Clegg, 2010; DeGroot & Schervish, 2012).

1. All responses are independent.
2. The variables were measured on ratio scale.
3. The variables are normal distributed.

The study investigated further influences of stakeholders' backgrounds on their perceptions of the sustainable development tools by implementing a regression analysis to gain explanations of stakeholders' perception. The method has to follow assumptions (DeGroot & Schervish, 2012; Hogg et al., 2013).

1. All responses are independent.
2. The relationship of dependent and independent variables is linear.
3. The variables were measured on ratio scale.
4. There is no significant outliner.
5. The variables are normal distributed.

4.2.2. Q-sort used in quantifying PTT's views of CSR

The purpose of using Q-sort was to investigate the PTT employees' perceptions of CSR in comparison with the MTP residents' perceptions of CSR. Q-sort is a research method which uses statistical techniques of factor analysis to reveal social perspectives (Webler et al., 2009). The method is an effective technique to disclose shared viewpoints that exist on a topic from a small sample size (Danielson et al., 2009; Van Exel & de Graaf, 2005). A number of studies employed the Q-sort to investigate stakeholders' perceptions of environmental issues (Danielson et al., 2009; Van Exel & de Graaf, 2005; Webler et al., 2009; Webler et al., 2001). A Q-sort study usually begins by collecting a concourse of an interested topic from literature review or a pilot study. Next steps are selecting Q statements from the concourse to represent all perceptions on the topic and identifying a group of participants. Participants in a Q-sort study are requested to express their perceptions of the interested topic by sorting the Q statements or called a Q-sort. Each Q-sort represents an individual's perception. The analysis of Q-sort responses reveal patterns how the participants perceive the topic. The results of the analysis are not only interpreted as patterns of social perspective but also expressed in the form of disagreement among the group of participants.

This study employed the Q-sort to investigate how employees of the case study (PTT) perceive CSR and what dimensions that they recognise as important for a CSR framework. The number of Q-sort participants was smaller when compared to the responses from the questionnaire participants. Therefore, the Q methodology was selected because of its strength in the robust analysis for a small sample size. The Q statements in this study were selected from CSR policy of PTT and preliminary interviews with PTT executives from the pilot study (Appendix IV). Participants were asked to arrange 27 statements which cover three dimensions of the PTT CSR policy (e.g. environment, economics and society) in rank order into nine categories from strongly agree (4) to strongly disagree (-4) (Figure 4-1). Demographic information such as age, educational level, working duration and function was also collected for participant identification. The results helped to understand the views of CSR from PTT's position. The Q-sort data were analysed by a statistical programme (PQMethod) which was specially designed for analysing Q data. The significant factor loading at 0.01 was calculated by 2.58 of standard errors which equal $1/(\sqrt{N})$. (N = number of statements)

$$\text{The significant factor loading} = 2.85(1/\sqrt{27}) = 0.497$$

The significant factor loading in the study should be excess of 0.497 for statistical significant at the 0.01 level. As the result, factor loading in the study at the 0.01 level of statistically significant is 0.5.

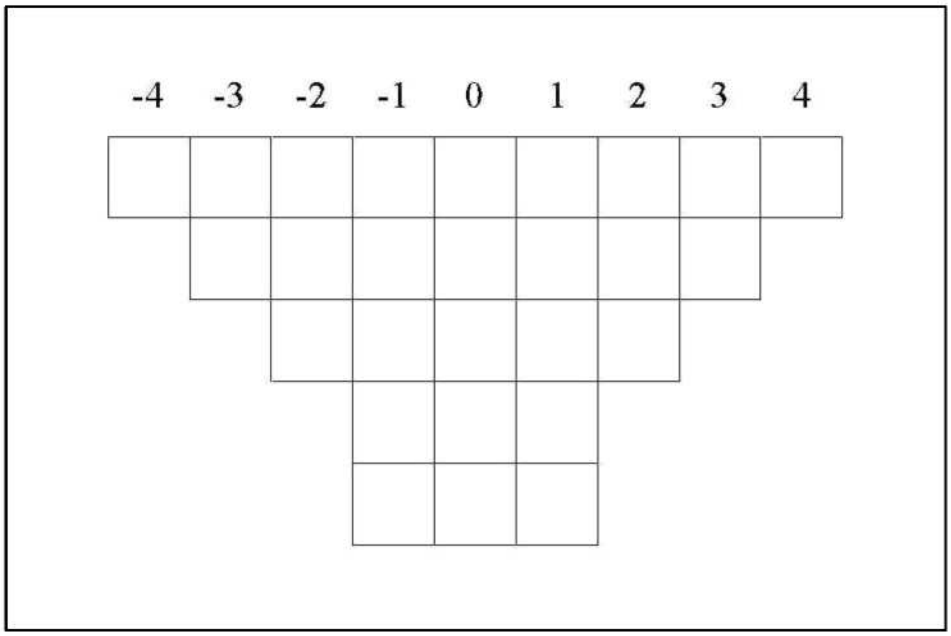

Figure 4-1: The shape of Q-sort statements distribution

4.2.3. In-depth interviews used in exploring PTT executives' perceptions

The aim of using in-depth interview in this study was to explore how PTT executives perceive CSR and what are the underlying reasons behind PTT's CSR policy. In-depth interviews are a conventional method to qualitatively explain social phenomena (Hesse-Biber & Leavy, 2010; Patton, 2002). Interviews are useful in gaining insights into underlying reasons or motives of participants' views on a particular topic. In-depth interviews are one-on-one method of conversation between the researcher and interviewee (Hesse-Biber & Leavy, 2010). The conversation is normally guided by an interview schedule which depends on research questions (Silverman, 2011).

In the study six PTT executives were invited to provide a business view of CSR for comparing with the MTP residents' perceptions of CSR. The in-depth interviews were held as informal discussions, which were guided in the form of a semi-structured interview (Appendix V). A semi-structured schedule relies on a list of questions to guide the discussion, however, it allows interviewees to have freedoms to introduce or suggest their topics which are relevant to the discussion (Hesse-Biber

& Leavy, 2010). The informal atmosphere is conducive to free and forthright expression of viewpoints from the interviewees to express their opinions (Patton, 2002).

The data from the in-depth interviews were analysed by qualitative research methods. Thematic analysis, a method for identifying and analysing qualitative data, is used in this study. This approach is used to organise the data by coding into themes or subthemes. These themes help in making interpretation and answering the research questions (Braun & Clarke, 2006). The participants' responses were coded into different themes or subthemes. Then, the results were interpreted and analysed by a qualitative programme (QSR NVivo 9).

4.2.4. Focus groups used in exploring MTP residents' perceptions

A focus group is a time-efficient research method of collecting qualitative data of attitudes, beliefs, concerns, interests and opinions from a group of participants at one time (Hesse-Biber & Leavy, 2010). Focus groups have been increasingly recognised as an effective method to gain insights into participants' attitudes and life experiences and are frequently used as a part of the mixed methods approach (Goltz, 2009; Hesse-Biber & Leavy, 2010). The dynamic nature of focus groups is different from in-depth interviews because data generation is based on interaction between multiple people. Focus groups are useful to identify problems, definitions and concepts of a particular topic because participants in focus groups can change their views or challenge previously held attitudes when they agree or disagree with other participants in the group (Hesse-Biber & Leavy, 2010; Morgan et al., 2008).

In this study the focus groups were implemented after the questionnaire survey. The MTP residents in the questionnaire survey from different backgrounds, such as different living communities, educational and migrant backgrounds, were invited to participate in six focus group discussions. Each focus group session was guided by a list of semi-structured interview questions to explore participations' perceptions based on the research questions. For example, the interview questions for the study of the influence of spatial context on residents' perceptions of the environment and EMS in MTP was design to compare the perceptions of residents between the a

group of residents who live in a community around the MTP industrial estate and the other groups of residents who live in a community farther away from the industrial estate. For the research question (2), there were two focus group sessions to compare the level of stakeholders' interest in environmental public participation between local and migrant resident in the area. There were also other two focus group sessions to compare the level of stakeholders' understanding of environmental public participation between higher education group and high school or lower education group.

The data from the focus groups were also analysed by the thematic method. Furthermore, the interaction influences such as supporting, disagreement or interruption were recorded for the analysis (Hesse-Biber & Leavy, 2010). The focus group discussions were analysed and coded by the QSR NVivo 9.

4.3. Ethical considerations

In order to address ethical issues, ethical approval was sought for this thesis from Ethical Committee of the Environment Department, University of York, for clearance to conduct this study. Human dignity is one of important issues in the ethical consideration; while the study can help promote the value of human life, it can be a potential harm (De Koninck, 2009). I as a researcher consider ethics and show respect for human dignity throughout the research (respect for individual consent, privacy and confidentiality). Participants in this study were residents in MTP and PTT officers. Before the implementation of the questionnaire data collection, community leaders in MTP as "gatekeepers" were notified of my study plan in order to ensure that the data collection does not contravene the norms or laws in the area.

I informed about the purpose of the study to all participants in this thesis, how they would participate in the study and how data would be handled (Appendix I). They were recruited for the study only if they volunteered themselves. Participants were assured that their anonymity will be protected in any publications related to the findings, or any future publications based on the research. The participants were also told that their involvement in the study will be kept anonymous and confidential. The

participants were informed that their responses will be changed to be electronic database and kept in a safe place. They were informed orally of the ethical considerations before conducting interviews and told that their response would be recorded by a voice recorder. They were not required to sign their name on the consent forms (Appendix II). Such forms were distributed to participants before the implementation of questionnaires, interviews and Q-sorts. Participants were informed of their rights to withdraw at any time and to refuse to answer any question. The participants were informed by explanation about the nature and overview of questionnaire, Q-sort, focus groups and in-depth interviews (e.g. terminology and definition) before the study.

In terms of the thesis integrity, I had raised the issue of conflict of interest to the ethical committee and the committee had monitored potential conflict of interest to ensure that the issues do not impinge upon the integrity of the research conducted. As a researcher, I consider the matters of research integrity in conducting this thesis to be the most important issue. I understand that the financial conflict of interest could affect the design, conduct or reporting of this study, however it does not necessarily mean that there is any malpractice. I am solely responsible for the design, conduct or reporting of this study transparently without any direct or impartial influence from the sponsor (PTT). As this study was funded by PTT and I am an employee of PTT, I informed all participants before conducting data collections that the study will not be influenced in performing the study by any business of other interests to reassure the participants that the aims of this thesis are to develop and contribute to academic knowledge.

5. Implementation of the study and results

This chapter presents the process of the experimental surveys which were implemented to investigate stakeholders' perceptions and also presents results of the surveys, both the pilot study and field study. The collection of quantitative data is aimed to quantify the stakeholders' perceptions to test the hypothesis and to answer the research questions. The results of qualitative data collection offer more details and descriptions of stakeholders' perceptions, which are helpful to develop a deeper understanding of the results of the quantitative analysis.

5.1. Pilot study

The pilot study was administered in MTP, Thailand from September to October 2011 to collect necessary information for designing the research instruments and for establishing demographic data of MTP population. The research instruments were tested through the pilot study under the same conditions of the field study to provide validity and reliability of the research. The questionnaire was translated into Thai for testing the reliability of the research instruments with Thai participants. The reliability of the questionnaire in this thesis was tested with 36 Thai participants in June 2012, before the full implementation of the field study. Cronbach's alpha coefficient is a statistical indicator for checking reliability of variables in the questionnaire survey and to measure the reliability of internal consistency among groups of variables (Singh, 2007). The values of the Cronbach's alpha coefficient range from 0 – 1 and a high value of the Cronbach's alpha coefficient therefore means the scale has high reliability. The lower acceptant value is 0.7 and scale has alpha coefficient between 0.8 – 0.9 which is considered very good (DeVellis, 2003; Singh, 2007). The Cronbach's alpha reliability coefficient test of nine scales in the questionnaire was conducted from data of 36 participants in the pilot study; the values of Cronbach's alpha are more than 0.7 which is considered highly reliable (Table 5-1)

Table 5-1: Results of Cronbach's alpha test and descriptions of the scales

Variables		Numbers of Items	Cronbach's Alpha	Meaning of the scales
Research Question 1 - EMS	Air pollution	6	.937	Participants concern impacts from air pollution and VOCs. They perceive that air pollution mgt. is important.
	Wastewater	6	.909	Participants concern impacts on water supply and sea water. They perceive that wastewater mgt. is important.
	Industrial Impact	6	.802	Participants concern impacts from industrial waste and They perceive that industrial impact mgt. is important.
	Developmental impacts	8	.798	Participants concern impacts from development in the area. They perceive that developmental mgt. is important.
Research Question 2 - PP	Interest in ENV. Info	14	.858	Participants interested in environmental information. They have a lot of interest in participation process.
	Understanding of ENV. Info	14	.897	Participants understand environmental information. They have a good understanding of the information.
Research Question 3 - CSR	Environment	8	.914	Participants think that business must focus on environment. They perceive that environmental dimension is important.
	Economics	8	.847	Participants think that business must focus on economics. They perceive that economic dimension is important.
	Society	7	.848	Participants think that business must focus on society. They perceive that social dimension is important.

5.2. Field study

The field study was conducted in Thailand. The data collection survey lasted for 12 weeks (three months) from August to October 2012. The study was divided into two parts, i.e. quantitative and qualitative data collection. The research methods are interlinked and inter-supported to explore participants' perceptions and, at the same time, to answer the research questions. Participant recruiting was mixed and balanced by introducing the cluster sampling in public areas (e.g. market or temple) and the snowball sampling. I contacted the community leaders, who are considered as "gatekeepers", through online contact on MTP website. I introduced myself and the thesis on the telephone before implementing the data collection to ensure that the data collection does not contravene the norms or laws in the area. Moreover, the community leaders helped in identifying and addressing questionnaire participants in the area. After the implementation of the questionnaire survey, a number of questionnaire participants were randomly select to participate in the focus groups. Participants in the Q-sort survey were PTT executives and staff from CSR and operational department; PTT executives from the Q-sort data collection were also invited to interviews for providing a more in-depth description of qualitative data to the study.

Participants were MTP residents and PTT officers. I explained the objective of the thesis to the participants and asked for their permissions to conduct the survey. The participant consent forms were distributed before the implementation of questionnaires, Q-sorts and interviews. The participants were told that results from the survey would be used anonymously as a part of the thesis or future report based on this research. They were assured of their rights to withdraw from the survey whenever they want to do so, and their responses would be kept confidential.

5.2.1. Questionnaire

The questionnaire was administered at the first stage of the data collection. The questionnaire participants in the survey were residents from 33 communities in the MTP area. Demographic data presents the background of participants in the questionnaire survey. To assure random collection, participants were addressed by cluster and snowball sampling. Cluster sampling is a probability sampling involves an entirely random selection of sample from the population within areas (Singh, 2007). The participants were divided into groups of population, practically by their respective geographical regions. Snowball sampling is also applied because of the impracticality to address the entire population.

In 2010, MTP had a population of about 50,000 people across 33 communities. 395 sets of questionnaire were collected from participants across MTP. The number of participants from each community was balanced as proportional to its population by stratified sampling method (Table 5-2). The stratified sampling refers to proportion dividing the population into subgroups or strata (Gregoire & Valentine, 2007). Subgroups can possible depend on several criteria such as sex, age group or geographic boundaries (Patton, 2002).

Personal data such as gender, age, educational level and duration of individuals' living in MTP was collected for further analysis. The backgrounds of the participants were analysed to investigate the influence of personal background on their perceptions. In the survey, an average age of sample is 44.63 years, with an age ranging from 21 to 84 years. The average duration of living in MTP is 31.81 years, varied from 1 to 84 years. There were 238 male participants (60.3%) of the total 395 participants. 157 questionnaires (39.7%) were collected from female participants.

Table 5-2: Number of questionnaire participants by community

No.	Community	Populations		Participants	
1	Nongpab	1,280	2.60%	10	2.53%
2	Takuan-Aupradoo	2,067	4.20%	20	5.06%
3	Soiraumpattana	2,242	4.55%	20	5.06%
4	Soipapa	1,092	2.22%	10	2.53%
5	Watsopol	1,419	2.88%	10	2.53%
6	Taladmaptaphut	2,536	5.15%	20	5.06%
7	Islam	1,358	2.76%	10	2.53%
8	Baanplong	909	1.85%	10	2.53%
9	Mapya	1,376	2.79%	10	2.53%
10	Hauypongnai 1	1,281	2.60%	10	2.53%
11	Hauypongnai 2	1,975	4.01%	15	3.80%
12	Hauypongnai-Sapan	1,224	2.48%	10	2.53%
13	Taladhauypong	1,725	3.50%	15	3.80%
14	Mapchalood	2,301	4.67%	20	5.06%
15	Krokyaicha	672	1.36%	5	1.27%
16	Koakok-Nongtungmae	1,044	2.12%	10	2.53%
17	Koakok	677	1.37%	5	1.27%
18	Nongnamyen	811	1.65%	5	1.27%
19	Nongbaudang	959	1.95%	10	2.53%
20	Klongnamhoo	590	1.20%	5	1.27%
21	Kodehin	4,273	8.67%	30	7.59%
22	Kaopai	1,299	2.64%	10	2.53%
23	Baanlang	2,710	5.50%	20	5.06%
24	Watmaptaphut	2,314	4.70%	20	5.06%
25	Samnukkabak	522	1.06%	5	1.27%
26	Baanbon	1,458	2.96%	10	2.53%
27	Naenpayom	1,391	2.82%	10	2.53%
28	Mapka-Mapnai	1,140	2.31%	10	2.53%
29	Mapka-Samnakaingon	1,341	2.72%	10	2.53%
30	Nongwaisom	1,189	2.41%	10	2.53%
31	Soikiree	744	1.51%	5	1.27%
32	Chareanpatana	659	1.34%	5	1.27%
33	Saklookya	2,683	5.45%	20	5.06%
	Total	49,261	100.00%	395	100.00%

In the study the educational backgrounds were classified into six categories; primary school, secondary school, high school, certificate/diploma, undergraduate and postgraduate. Out of the 395 (100%) participants, 284 (71.9%) participants had high school education or lower, while 111 (28.1%) participants had higher education. The results in Table 5-3 indicate that 109 (27.6%) participants finished primary school, followed by participants from secondary school and high school which are accounted for 94 (23.8%) and 81 (20.5%) respectively. Among those with higher education, 67 (17.0%) participants were certificate/diploma holders. There were 35 (8.9%) and 9 (2.3%) participants graduated from undergraduate and postgraduate level respectively.

There were two groups of participants from different migrant backgrounds, one being locally born and the other were migrant population (Table 5-3). They were sorted based on the following determining circumstances. If they have lived in MTP for durations shorter than their age, they were classified as migrant populations. Out of a total of 395 participants, as many as 200 participants (50.6%) were native-born to MTP, while 195 (49.4%) were migrant populations.

Table 5-3: Demographic information and statistics of the questionnaire participants

	Educational level						Total
	High school education and lower			Higher education			
Gender	Primary School	Secondary School	High School	Certificate / Diploma	Undergraduate	Postgraduate	
Male	64	56	51	40	21	6	238
	16.2%	14.2%	12.9%	10.1%	5.3%	1.5%	60.3%
Female	45	38	30	27	14	3	157
	11.4%	9.6%	7.6%	6.8%	3.5%	0.8%	39.7%
Migrant data	Primary School	Secondary School	High School	Certificate / Diploma	Undergraduate	Postgraduate	Total
Local	68	43	36	32	18	3	200
	17.2%	10.9%	9.1%	8.1%	4.6%	0.8%	50.6%
Migrant	41	51	45	35	17	6	195
	10.4%	12.9%	11.4%	8.9%	4.3%	1.5%	49.4%
Total	109	94	81	67	35	9	
	27.6%	23.8%	20.5%	17.0%	8.9%	2.3%	395
			284			111	100.0%
			71.9%			28.1%	

5.2.2. Q-sort

In the study the Q-sort survey was employed to explore a business view of CSR from the case study, PTT. The results of the Q-sort reveal the underlying factors behind PTT's CSR policy. 48 PTT officers with an equal number of officers from CSR department and operational function were invited to participate in the survey. The number of Q-sort participants was smaller, compared to the questionnaire participants. Therefore, the Q methodology was selected because of its strength in the robust analysis for a small sample size.

Out of the 48 (100%) participants, 44 (91.6%) participants had postgraduate degree while four (8.4%) participants had undergraduate education. The group of participants contained an equal number of PTT officers in CSR and the operational department. There were four categories of participants: (1) executives, (2) project management, (3) MTP base and (4) headquarter base (Table 5-4). The executives group consisted of vice president(s) or higher ranking officers. The project management team group consisted of officers who are responsible for developing new projects. MTP base group consisted of officers who are working for PTT's operation in MTP and headquarter base group consisted of officers who are working in the PTT's main office in Bangkok.

Table 5-4: Demographic information of Q-sort participations

	Education		Total	Average	
	Under -graduate	Post -graduate		Age (yrs.)	Work (yrs.)
PTT's operational officers			24 (50.0%)	41.7	16.5
- Executives		6 (12.5%)	6 (12.5%)	50.2	22.0
- Project management	1 (2.1%)	5 (10.4%)	6 (12.5%)	43.8	19.0
- MTP base	1 (2.1%)	5 (10.4%)	6 (12.5%)	38.8	15.8
- Headquarter base		6 (12.5%)	6 (12.5%)	33.8	9.0
PTT's CSR officers			24 (50.0%)	38.4	11.9
- Executives		6 (12.5%)	6 (12.5%)	50.6	25.3
- Project management	1 (2.1%)	5 (10.4%)	6 (12.5%)	39.5	11.3
- MTP base		6 (12.5%)	6 (12.5%)	30.5	3.2
- Headquarter base	1 (2.1%)	5 (10.4%)	6 (12.5%)	32.8	8.0
Total	4 (8.4%)	44 (91.6%)	48 (100%)	40.0	14.2

5.2.3. In-depth interviews

Six executives from Q-sort survey were invited to participate in the in-depth interviews for providing more information and explanation of their business views of CSR in order to compare with MTP residents' perceptions of CSR. The six executives consisted of two chief operation officers, two executive vice presidents and two vice presidents. In the survey, the average age of the participants was 55.67 years, with an age range from 48 to 59 years. The average duration of working for PTT is 23.33 years, varying from 18 to 28 years. An analysis of the in-depth interviews is to support and validate the quantitative results in identifying the company perceptions of CSR from the Q-sort analysis.

All interviews were conducted as a private discussion session within an informal atmosphere where the interviewees can more comfortably express their opinions. All interview sessions were conducted in Thai and guided by a semi-structured interview schedule (Appendix V). The lists of questions were designed to compare the perceptions of CSR between the company and the community. However, as a semi-structure interview, the order of the questions was not fixed and keeping discussions continue without interruption. In the first part of interviews, participants were asked to explain their perceptions and definition of CSR. This part helped to give an overview of participants' perceptions: the dimensions that the participant perceives to be the main elements of CSR. This information is useful to continue and develop the interview to gain deeper and more comprehensive detail. Then, they asked to discuss the CSR policy of PTT. This part focused on PTT's CSR activities and underlying reasons behind the CSR policy. The results help with the understanding how CSR is perceived from the business sector's point of view.

5.2.4. Focus groups

The questionnaire participants from different backgrounds were invited to participate in six focus groups. There were six groups of residents from different spatial, migration and educational backgrounds. These group discussions were aimed at validating the results gained from the analysis of quantitative data. All participants agreed to participate, on a voluntary basis, as part of a particular focus group. There were six participants in all groups. All session of the focus groups were conducted in

Thai. The lists of discussion questions were designed to compare the perceptions of participants from different groups (Appendix VI). The discussions were semi-structured. As the order of the questions was not fixed, it allowed the discussions to continue without any interruption.

The focus groups discussion was divided into two parts. The first part focused on participants' perceptions of the environmental management and public participation in MTP to gain their general attitudes towards the quality of environment, environmental management, and environmental information in MTP. This also contributes to the improvement of environmental management, and environmental information engagement. The results of the first part help in gaining the insights into participants' perceptions of environmental management and public participation in MTP. The second part of discussion was to explore what the residents expected of the industrial sector, and how they perceived CSR. The results of the second-part discussion were used to compare with the business view of CSR from the perspectives of PTT executives.

6. Stakeholders' perceptions for improving Environmental Management System

This chapter studies the relationships between stakeholders' spatial backgrounds and their environmental perceptions. The study investigates the stakeholders' perceptions of four environmental aspects: air pollution, wastewater, industrial impact and developmental impact. This study compares residents' perceptions of the environment from different communities in Map Ta Phut (MTP), Thailand, to understand how the spatial context influences on the local stakeholders' perception of the environment.

6.1. Introduction

The number of EMS adoptions has been increasing in past decades. However, a considerable number of studies argue that EMS adoption cannot assure a consistent improvement of environmental performance (Anton et al., 2004; Barla, 2007; Hertin et al., 2008; Prakash & Potoski, 2011; Wagner, 2005). The argument is that EMSs provide a management system for general environmental impacts but does not focus on any specific industry or type of pollution (Anton et al., 2004). For a successful EMS adoption, an organisation has to adapt its management system to be suitable for its industrial and domestic contexts (Hertin et al., 2008; Prakash & Potoski, 2011). This study attempts to show that the continuous improvement cycle of EMS is not enough to enable a consistent improvement of environmental performance and the local stakeholders' involvement with the industrial sector is necessary for evaluating the environmental performance and improving the EMS.

ISO 14001 has become one of the international EMS standards and has been promoted by the World Trade Organisation (WTO) as an international EMS standard to standardise the modern business world (Darnall et al., 2008; Kollman & Prakash, 2002). According to the ISO survey in 2012, there are over 280,000 ISO 14001 certifications in 167 countries around the world (ISO, 2013). Whilst ISO 14001 has been recognised as a global EMS standard, the adoption of ISO 14001 is being criticised from many aspects (Bansal & Bogner, 2002; Delmas & Montiel, 2008; Krut & Gleckman, 2013; Morrow & Rondinell, 2002; Rondinelli & Vastag, 2000).

First, the certification of ISO 14001 does not require an organisation to measure its actual environmental performance, but it relies on an assumption that the organisation complies with regulations, without any measurement (Delmas & Montiel, 2008; Rondinelli & Vastag, 2000). Furthermore, the environmental public statement is another critical point for ISO 14001 certifications; the standard does not require an organisation to publish its environmental statement, and therefore it is difficult for the wider stakeholders, such as local communities, to get involve with the organisation in the EMS improvement (Krut & Gleckman, 2013; Morrow & Rondinell, 2002). As a result, these aspects have raised doubts about the environmental performance of an organisation for its stakeholders. A lack of confidence in environmental information can raise public concern and be a challenge for the environmental regulators (Gouldson, 2004). The involvement of local stakeholders is important for an organisation to gain information about its environmental performance from an outsider's viewpoint (Kollman & Prakash, 2002; Reed, 2008). This study seeks to improve EMS by getting useful information from local stakeholders to help an industrial organisation in the review and development of its EMS.

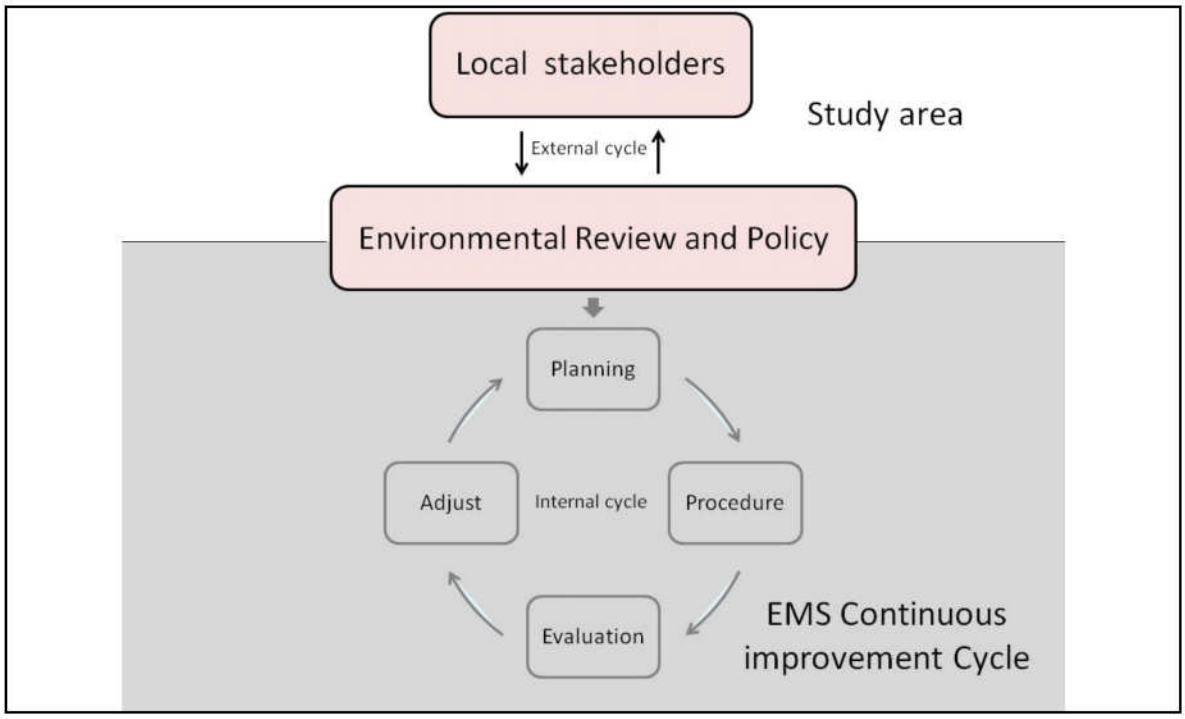

Figure 6-1: Diagram showing the area of the study that focuses on the involvement of local stakeholders to help in the review and development of EMS.

For decades, the Thailand Industrial Standards Institute (TISI), as the authorized body of Thailand, has developed ISO 14001 as the national standard. Approximately 80% of industrial operators in MTP acquired ISO 14001 certificates. However, the number of complaints has been increasing, implying that the relationship between companies and communities were getting worse (Saengsupavanich et al., 2009). MTP industrial estate, located in Rayong province, is the largest industrial complex in Thailand and one of the biggest petrochemical hubs in the world (Figure 6-2). Managing the MTP environmental impacts has been one of the biggest challenges for the Thai government, which has to balance economic growth with environmental concerns (Charoensin-o-larn, 2010; Dorsch et al., 2010; Komachi, 2010; Nidhiprabha, 2010; Pinyochatchinda & Walsh, 2012). The residents in the MTP area believe that the industrial sector in MTP has caused environmental and health impacts. On the one hand, a number of studies have reported the relationships between industrial emissions and health impacts in MTP (Jadsri et al., 2006; Peluso et al., 2008; Pimpisut et al., 2005; Tanyanont & Vichit-Vadakan, 2012; Uapipatanakul, 2009). But, on the other hand, the industrial sector is sceptical about the credential of the reports because these studies are not based on a health report in MTP but referred to the Rayong health reports, which are provincial scale reports. As a result, the Central Administrative Court of Thailand suspended 76 new projects during 2009 in MTP with an estimated impact on investment of approximately £4 billion (Charoensin-o-larn, 2010; Dorsch et al., 2010). It could have been that the inaccurate and unreliable information about environmental and health impacts in MTP were the root cause of the problem in the area and consequentially the suspension order.

Figure 6-2: Map showing the location of MTP industrial estate in Rayong province.

This chapter investigates the relationship between stakeholders' backgrounds and how their perceptions of environmental impacts vary across space. Stakeholders' perceptions of the environment can help an industrial organisation to point out the local environmental problems (Reed, 2008). It seeks to address how the location of a community influences the residents' perceptions of the environment in MTP using PTT, a national oil company in Thailand as a case study. The MTP residents' perceptions of four environmental aspects; air pollution, wastewater, industrial impact and developmental impact are investigated to test the hypothesis that the stakeholders' spatial backgrounds influence their perceptions of environmental management. A community with residents who perceive that the effect of a particular environmental aspect is high tends to have residents showing more concern over the impacts from the particular emission and feeling that the environmental management of the emission is important.

The influences of the spatial background on the perceptions of the environment were analysed by a mixed methods approach (Methodology). In this study, a questionnaire survey was implemented in 2012 to collect the MTP residents' perceptions of the environment. Independent sample t-tests were used to compare statistical significant

differences in the MTP residents' perceptions by classifying participants into two groups. Participants, living within a radius of five kilometres from the MTP industrial complex, were classified into a group of "Near communities". The others, living farther away from the MTP industrial complex, were classified into the "Far communities" group. The five-kilometre criterion is based on Thailand's regulation guidelines for an environmental impact assessment report, and follow-up monitoring reports during the operational phase (ONEP, 2012). Further investigation of the MTP residents' perceptions was analysed by a regression analysis to explore the influence of the stakeholders' spatial backgrounds over their perceptions of the environment. In the qualitative part of the study, focus groups were implemented to reveal insights into the MTP residents' perceptions. The results of the focus group discussions provide a greater understanding of the perceptions of the environment and support the results from the quantitative analysis.

6.2. Analysis of quantitative results

This section presents the analysis of quantitative data collecting from the questionnaire survey, which was implemented to collect the MTP residents' perceptions of the environment. The data is used to compare MTP residents' perceptions of four environmental aspects (e.g. air pollution, wastewater, industrial impact and developmental impact) by the use of independent sample t-tests that check the statistical difference of the questionnaire participants' perceptions from different communities. The total number of questionnaire participants was 395 with 185 participants from communities within a radius of five kilometres from the MTP industrial complex (classified as "Near communities") and the other 210 participants from farther away communities (classified as "Far communities" group). The questionnaire data complies with the assumptions of the independent sample t-test. The participants were collected randomly and their responses were independent. The participants' responses were measured and calculated on a scale of 1-9. The distribution of variables was checked using a Shapiro-Wilk test before t-test implementation.

Table 6-1: Demographic information and statistics by distribution location

Demographic information		Near communities	Far communities
Gender	Male	117 (29.6%)	121 (30.6%)
	Female	68 (17.2%)	89 (22.5%)
	Total	185 (46.8%)	210 (53.2%)
Education level	Primary School	66 (16.7%)	43 (10.9%)
	Secondary School	31 (7.8%)	63 (15.9%)
	High School	28 (7.1%)	53 (13.4%)
	Certificate / Diploma	34 (8.6%)	33 (8.4%)
	Undergraduate	23 (5.8%)	12 (3.0%)
	Postgraduate	3 (0.8%)	6 (1.6%)
	Total	185 (46.8%)	210 (53.2%)

The Shapiro-Wilk statistical indicator was used to test the normality of the variables; the value of the test has to be higher than 0.05 (p-value > 0.05) to accept the null hypothesis. The null hypothesis of the test (H_0) is that the variable is normally distributed and is suitable for a t-test implementation. The questionnaire data was analysed with a quantitative data analysis programme, IBM SPSS Statistics 19.

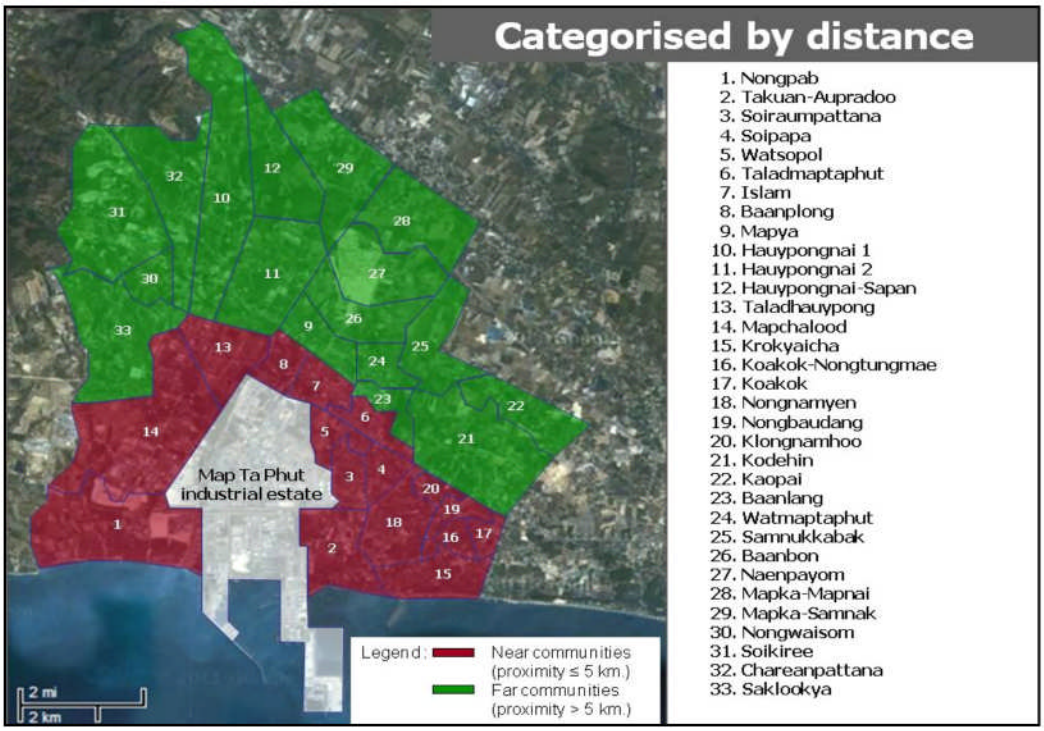

Figure 6-3: List of communities in Map Ta Phut presenting 16 'near' communities (red) and 17 'far' communities (green).

6.2.1. Residents' perceptions of air pollution

This section investigated the MTP residents' perceptions of air pollution such as nitrogen oxide, sulphur dioxide and volatile organic compounds (VOCs) and air pollution management in MTP, called air pollution scale. Higher value means that participants have more concern about air pollution and believe that air pollution management is an important aspect for an EMS. A comparison is made between perceptions of the near and far groups.

Table 6-2: The results of normality test and t-test of air pollution scale

Air pollution	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Near communities	185	7.4144	.77477	.985	185	.053
Far communities	210	5.8087	1.03773	.986	210	.054
Independent Samples t-test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances	F		Sig.	t	df	Sig.
not assumed	16.205		.000	17.548	382.993	.000

The results (Table 6-2) indicate that the null hypothesis (normally distributed data) is accepted ($p>0.05$). The t-test result shows a significant difference of perceptions between the two groups; the participants from near communities had higher scores on the air pollution scale than the participants from far communities ($t=17.548$, $df=382.993$, $p<0.05$). The interpretation is that residents in communities within five kilometres have greater concern about air pollution and think that air pollution management is more important than the residents who live within a community located farther away from the MTP industrial estate (Figure 6-4).

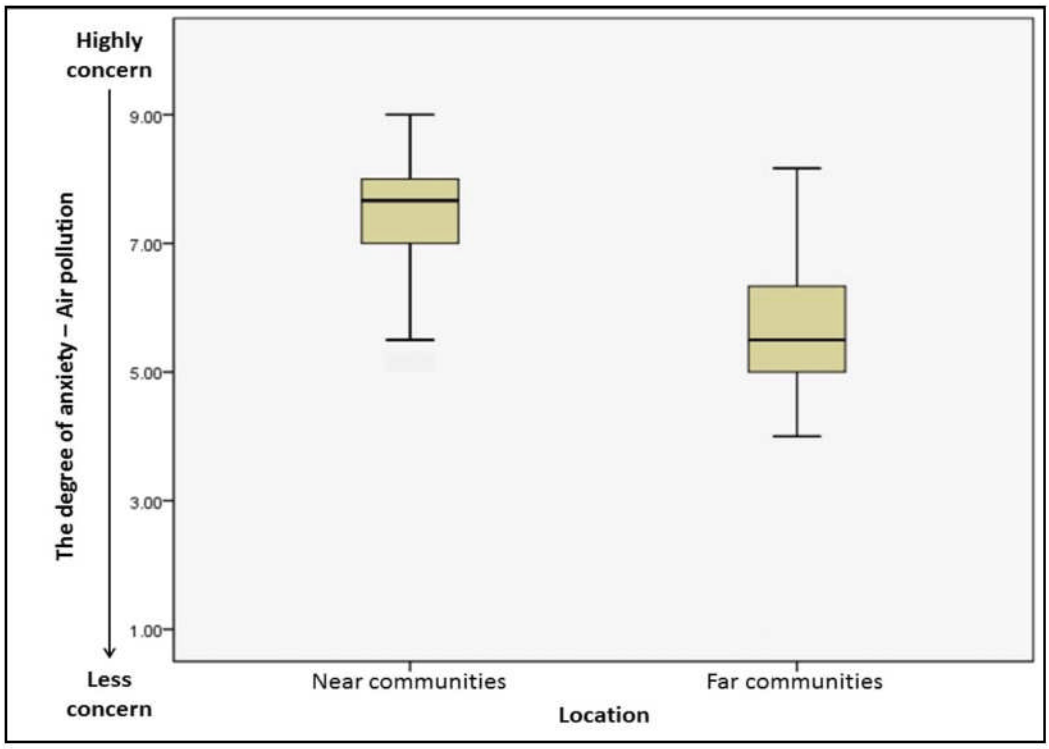

Figure 6-4: T-test result showing a comparison of air pollution scale between the near and far communities.

The study investigated further the influence of spatial background by implementing a regression analysis. The study analysed the correlation between the participants' perceptions and distances from a community to the industrial estate. It examined how the mean value of residents' perceptions in a community correlates with its proximity to the MTP industrial estate in terms of the absolute distance, longitudinal distance and latitudinal distance. The questionnaire survey complies with all assumptions of the regression analysis. The participants were collected randomly and

their responses were independent. All responses of the participants were measured and calculated on a scale of 1-9 and no significant outliers.

Table 6-3: Model summary of air pollution scale presenting the relationship between the stakeholder perceptions and spatial background.

	Model	R	R Square	Adjusted R Square	Coefficients		Sig.
					B	t	
1	(Constant)	.809	.655	.654	8.251	115.112	.000
	d_{long}				-0.624	-27.312	.000
2	(Constant)	.853	.728	.726	8.775	107.206	.000
	d_{long}				-0.582	-28.115	.000
	d_{lat}				-0.117	-10.223	.000
3	(Constant)	.865	.748	.746	8.679	107.457	.000
	d_{long}				-0.834	-16.900	.000
	d_{lat}				-0.546	-7.025	.000
	d_{abs}				0.493	5.574	.000

Note: d_{long} : Longitudinal distance from a community to the industrial estate (km.)
d_{lat} : Latitudinal distance from a community to the industrial estate (km.)
d_{abs} : Absolute distance from a community to the industrial estate (km.)

The results (Table 6-3) show a correlation between the community's concern about the air pollution and the distances from a community to the industrial estate that can be explained by the following equation.

$$Air\ pollution\ scale = 8.865 - 0.834d_{long} - 0.546d_{lat} + 0.493d_{abs}$$

The equation predicts a convergence of absolute distances and the MTP residents' concern on air pollution. However, the model shows an inverse correlation between the residents' concern and the longitudinal and latitudinal distances. The prediction is that for every 1 kilometre away from the industrial estate along the longitude and latitude there is a reduction in the degree of anxiety about air pollution of 0.834 and 0.546 respectively. The model has a degree of accuracy at 74.6% (adjusted R^2 = 0.746) which means it explains 74.6% of the observed questionnaire data. The distribution of the mean value of the degree of residents' anxiety on air pollution in 33 communities across MTP is presented in Figure 6-5.

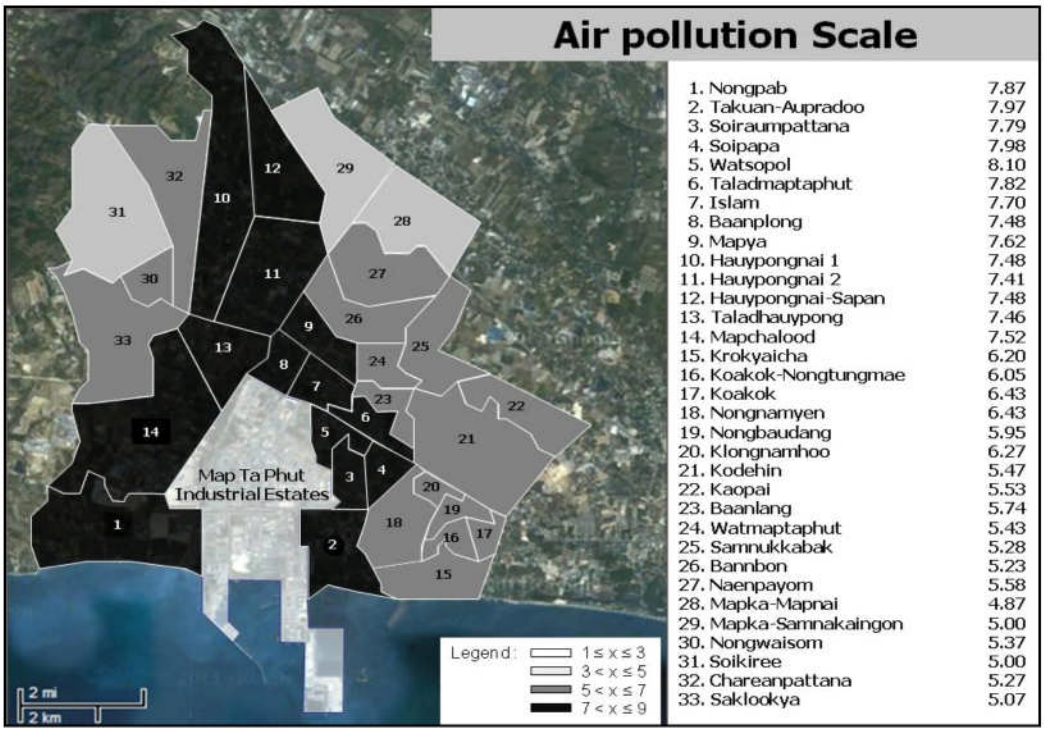

Figure 6-5: Map showing a distribution of air pollution scale in MTP into a four-band greyscale. The highest average degree of residents' anxiety on air pollution in a community shows in black areas, while the lowest average degree of residents' anxiety on air pollution in a community shows in white areas.

The map of the average degree of residents' anxiety on air pollution presents in four index bands to provide details about the level of residents' concerns over air pollution. The darkest area, for example; community (1) Nongpab, represents communities in which the residents have a high degree of anxiety about the effect of air pollution and think that air pollution management is more important than residents in a lighter area, such as community (31) Soikiree.

6.2.2. Residents' perceptions of wastewater

This section investigated the residents' perceptions of wastewater management and water quality in MTP called wastewater scale. Higher value means that participants worry about wastewater problems and think that wastewater management is an important aspect for EMS in MTP. A comparison is made between perceptions of the near and far groups.

Table 6-4: The results of normality test and t-test of wastewater scale

Wastewater	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Near communities	185	6.2261	1.39023	.985	185	.053
Far communities	210	5.0183	1.34566	.988	210	.071
Independent Samples t-test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances assumed	F		Sig.	t	df	Sig.
	.429		.513	8.765	393	.000

The results (Table 6-4) indicate that the null hypothesis of normally distributed data is accepted ($p>0.05$). The t-test result shows a significant difference of perceptions between the near and far groups ($t=8.765$, $df=393$, $p<0.05$). Participants from near communities had shown significantly more concern about wastewater and the quality of natural water resources in MTP and think that wastewater management is more important than participants from far communities (Figure 6-6)

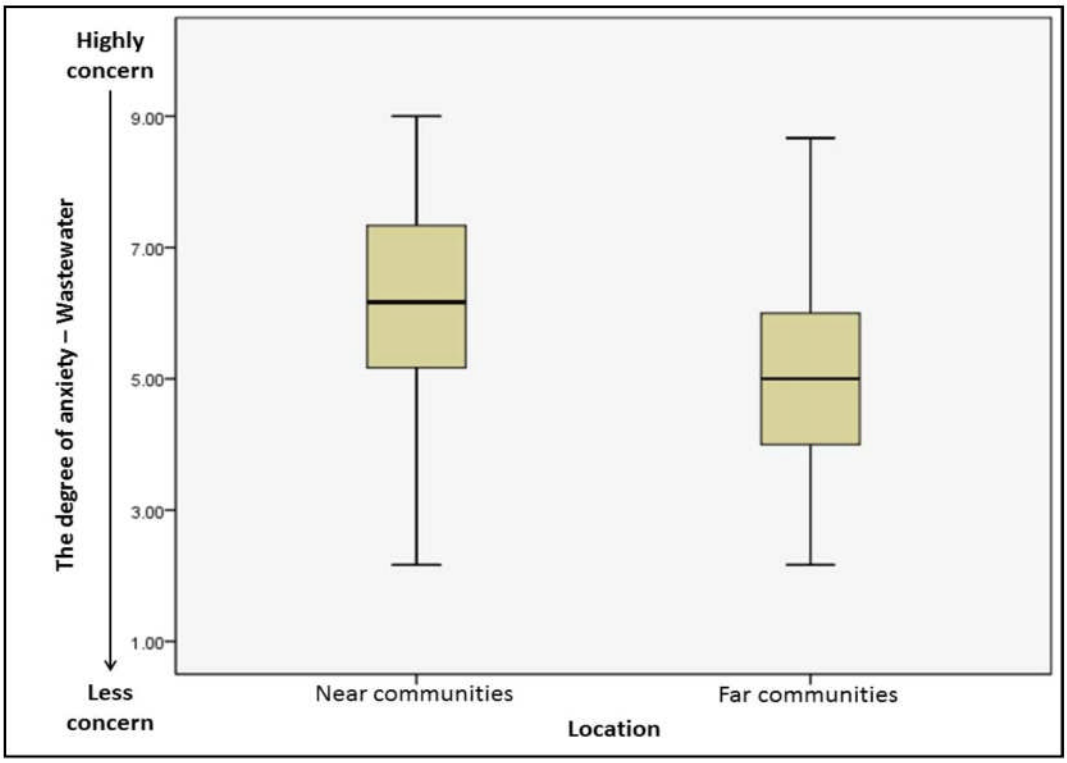

Figure 6-6: T-test result showing a comparison of wastewater scale between the near and far communities.

The investigation into the influence of spatial background on the perceptions of wastewater was examined by the regression analysis.

Table 6-5: Model summary of wastewater scale presenting the relationship between the stakeholder perceptions and spatial background

Model		R	R Square	Adjusted R Square	Coefficients		Sig.
					B	t	
1	(Constant)	.498	.248	.246	6.853	53.053	.000
	d_{long}				-0.468	-11.378	.000
2	(Constant)	.586	.344	.340	7.588	48.926	.000
	d_{long}				-0.410	-10.455	.000
	d_{lat}				-0.164	-7.560	.000

Note: d_{long} : Longitudinal distance from a community to the industrial estate (km.)
d_{lat} : Latitudinal distance from a community to the industrial estate (km.)

The results (Table 6-5) show that a correlation between the participants' concern about wastewater and the distances from a community to the industrial estate is explained by the following equation.

$$Wastewater\ scale = 7.588 - 0.410d_{long} - 0.164d_{lat}$$

The equation presents an inverse correlation between the residents' concern and the longitudinal and latitudinal distances. The model predicts that every 1 kilometre away from the industrial estate along the longitude and latitude reduces the degree of anxiety over wastewater by 0.410 and 0.164 respectively. The model has a degree of accuracy at 34% (adjusted $R^2 = 0.34$).

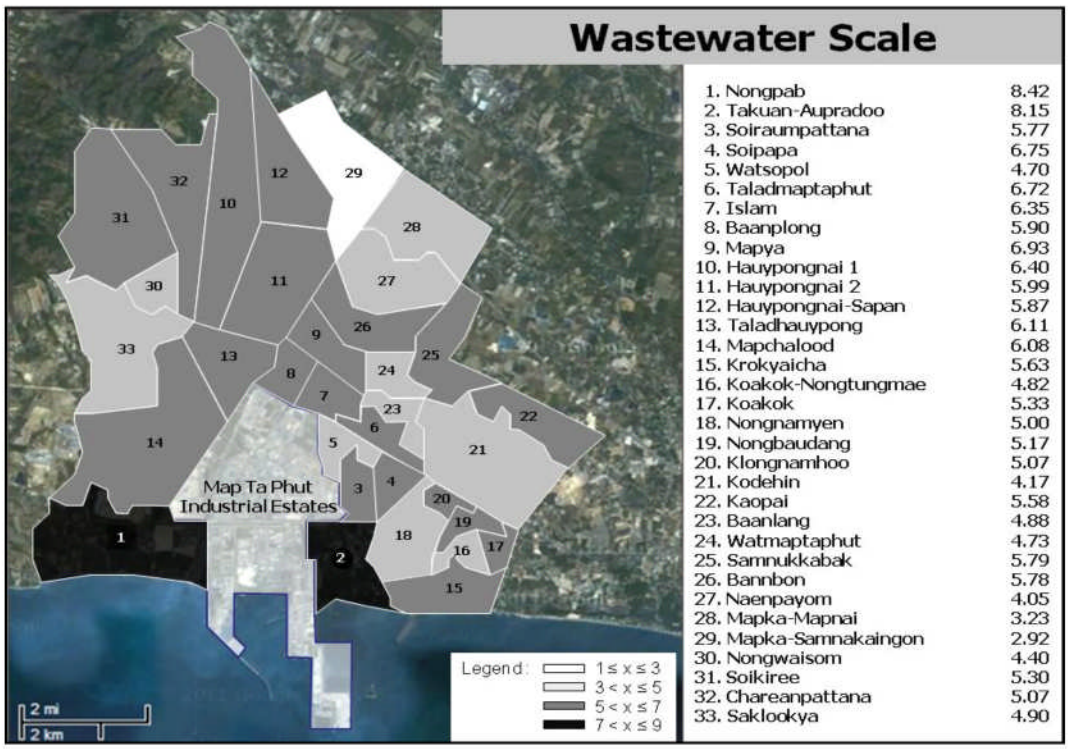

Figure 6-7: Map showing a distribution of wastewater scale in MTP into a four-band greyscale. The highest average degree of residents' anxiety on wastewater in a community shows in black areas, while the lowest average degree of residents' anxiety on wastewater in a community shows in white areas.

The map of the concerns over wastewater shows that residents in the black areas, e.g. community (1) Nongpab and (2) Takuan-Aupradoo have highest concern about the qualities of natural water resources such as seawater and think that the wastewater management in MTP is important (Figure 6-7).

6.2.3. Residents' perceptions of industrial impact

This section investigated the residents' perceptions of industrial impacts such as industrial waste management, noise and light pollution around the operational area. Higher value means that participants have greater concern about impact from the industrial estate and think that industrial management is important for the EMS in MTP. The study compares the perceptions of industrial impact between residents from the near and far groups

Table 6-6: The results of normality test and t-test of industrial impact scale

Industrial impact	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Near communities	185	5.9523	1.34449	.986	185	.055
Far communities	210	4.6817	1.05664	.987	210	.060
Independent Samples t-test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances	F		Sig.	t	df	Sig.
not assumed	12.694		.000	10.344	347.966	.000

The results (Table 6-6) indicate that the null hypothesis (normally distributed data) is accepted ($p>0.05$). The t-test result shows a significant difference of perceptions between the near and far groups ($t=10.344$, $df=347.966$, $p<0.05$). Participants from near communities had a higher degree of anxiety over industrial impact and thought that industrial impact management is more important than participants from far communities (Figure 6-8).

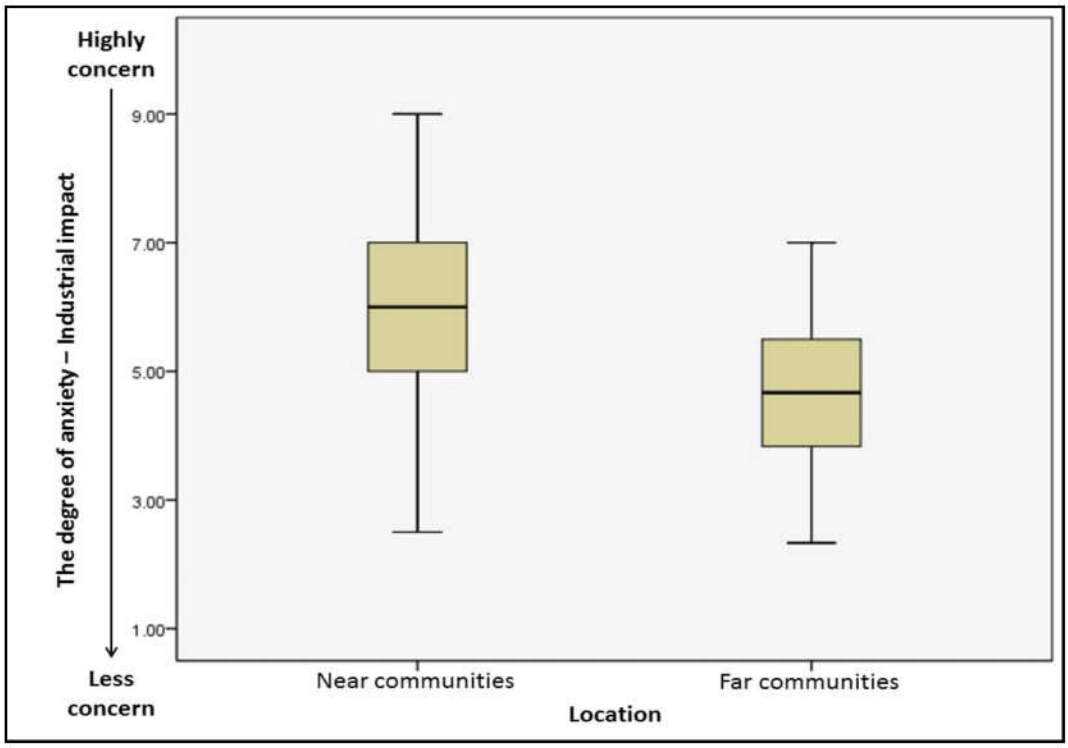

Figure 6-8: T-test result showing a comparison of industrial impact scale between the near and far communities.

The investigation on the influence of spatial background on the perception of industrial impact was examined by the regression analysis.

Table 6-7: Model summary of industrial impact scale presenting the relationship between the stakeholder perceptions and spatial background

Model		R	R Square	Adjusted R Square	Coefficients		Sig.
					B	t	
1	(Constant)	.489	.239	.237	6.408	54.274	.000
	d_{long}				-0.418	-11.102	.000
2	(Constant)	.552	.305	.302	6.987	47.441	.000
	d_{long}				-0.302	-7.436	.000
	d_{abs}				-0.141	-6.120	.000
3	(Constant)	.568	.363	.317	7.045	48.009	.000
	d_{long}				-0.047	-0.529	.000
	d_{abs}				-0.647	-4.025	.000
	d_{lat}				0.449	3.177	.000
4	(Constant)	.568	.322	.319	7.044	48.050	.000
	d_{abs}				-0.725	-11.155	.000
	d_{lat}				0.516	8.155	.000

Note: d_{long} : Longitudinal distance from a community to the industrial estate (km.)
d_{lat} : Latitudinal distance from a community to the industrial estate (km.)
d_{abs} : Absolute distance from a community to the industrial estate (km.)

The results (Table 6-7) show that a correlation between participants' concern about industrial impact and the distances from a community to the industrial estate is explained by the following equation.

$$Industrial\ impact\ scale = 7.044 - 0.725d_{abs} + 0.516d_{lat}$$

The equation shows an inverse correlation between absolute distance from a community to the industrial estate and participants' anxiety over industrial impact. The model shows that every 1 kilometre away from the industrial estate reduces the degree of anxiety about industrial impacts scale 0.725. However, the latitudinal distance has a positive correlation with the degree of anxiety over industrial impact of about 0.516 for every 1 kilometre along the latitude. The model has a degree of accuracy at 31.9% (adjusted R^2 = 0.319). An overview of the MTP residents' perceptions of industrial impact in 33 communities is presents in Figure 6-9.

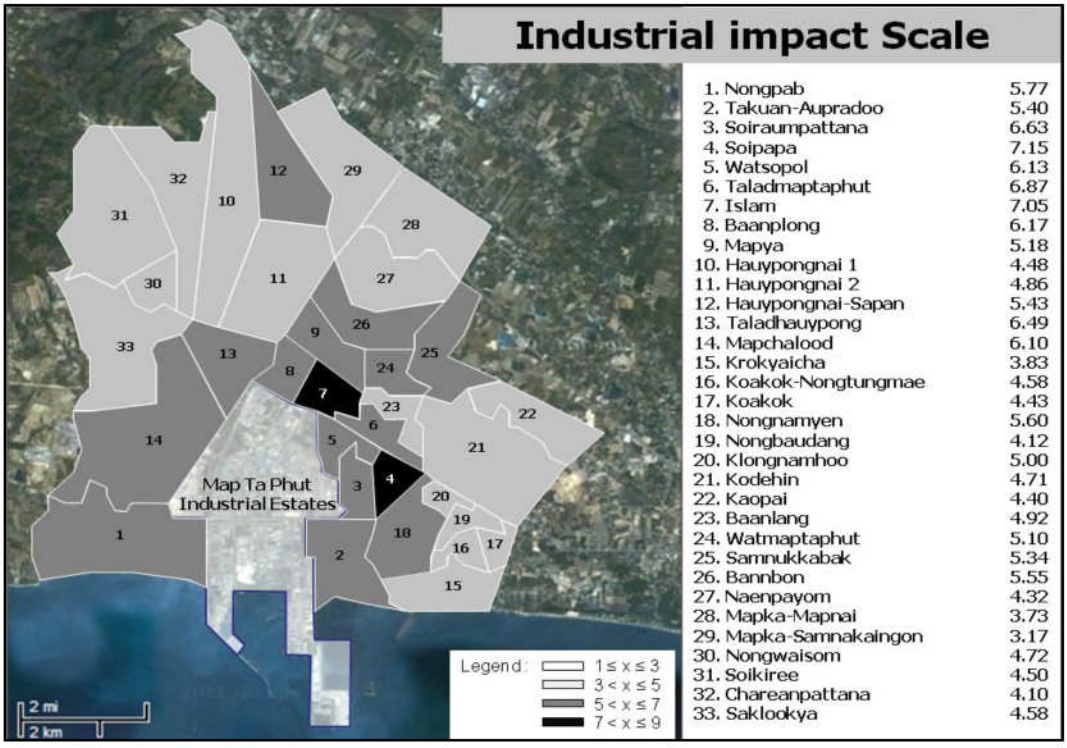

Figure 6-9: Map showing a distribution of industrial scale in MTP into a four-band greyscale. The highest average degree of residents' anxiety on industrial impact in a community shows in black areas, while the lowest average degree of residents' anxiety on industrial impact in a community shows in white areas.

6.2.4. Residents' perceptions of developmental impact

This section investigated the participants' perceptions of developmental impacts such as the problems of green space, crime and traffic congestion in the area. The study compares the perceptions of the developmental impacts between residents from the near and far communities.

Table 6-8: The results of normality test and t-test of developmental impact scale

Developmental impact	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Near communities	185	5.2331	1.68573	.986	185	.065
Far communities	210	5.2012	1.74367	.987	210	.057
Independent Samples t-test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances assumed	F		Sig.	t	df	Sig.
	.083		.774	.184	393	.854

The results (Table 6-8) indicate that the null hypothesis (normally distributed data) is accepted ($p>0.05$). The t-test result shows no significant difference of perceptions between the two groups ($t=0.184$, $df=393$, $p>0.05$).

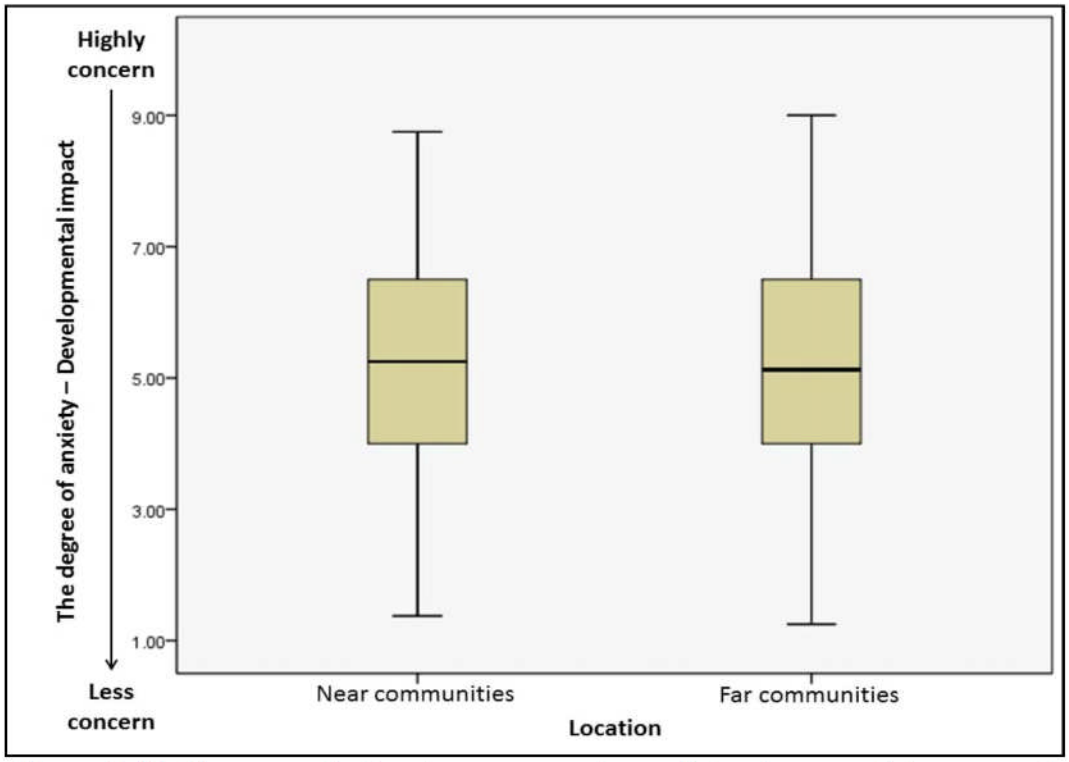

Figure 6-10: T-test result showing a comparison of developmental impact scale between the near and far communities.

The investigation into the influence of spatial background on the perceptions of developmental impact was examined by the regression analysis. The analysis of correlation between the participants' perceptions and the distances from a community to the industrial estate is shown in Table 6-9.

Table 6-9: Model summary of industrial impact scale presenting the relationship between the stakeholder perceptions and spatial background

Model		R	R Square	Adjusted R Square	Coefficients		Sig.
					B	t	
1	(Constant)	.260	.068	.065	5.978	36.188	.000
	d_{long}				-0.281	-5.346	.000
2	(Constant)	.280	.078	.074	5.698	26.989	.000
	d_{long}				-0.303	-5.679	.000
	d_{lat}				0.063	2.119	.035
3	(Constant)	.298	.089	.082	5.795	26.923	.000
	d_{long}				-0.052	-0.393	.695
	d_{lat}				0.492	2.375	.018
	d_{abs}				-0.494	-2.094	.037
4	(Constant)	.297	.088	.084	5.793	26.950	.000
	d_{lat}				0.565	6.091	.000
	d_{abs}				-0.578	-6.070	.000

Note: d_{long} : Longitudinal distance from a community to the industrial estate (km.)
d_{lat} : Latitudinal distance from a community to the industrial estate (km.)
d_{abs} : Absolute distance from a community to the industrial estate (km.)

The results show that a correlation between participants' concern over developmental impact and the distances from a community to the industrial estate is explained by the following equation.

$$Developmental\ impact\ scale = 5.793 + 0.565d_{lat} - 0.578d_{abs}$$

While the developmental impact scale has a positive correlation with the latitudinal distance, the scale shows an inverse correlation with the absolute distance from a community to the industrial estate. However, the model must be interpreted with caution because the degree of accuracy of the equation is just 8.4% (adjusted R^2 = 0.084).

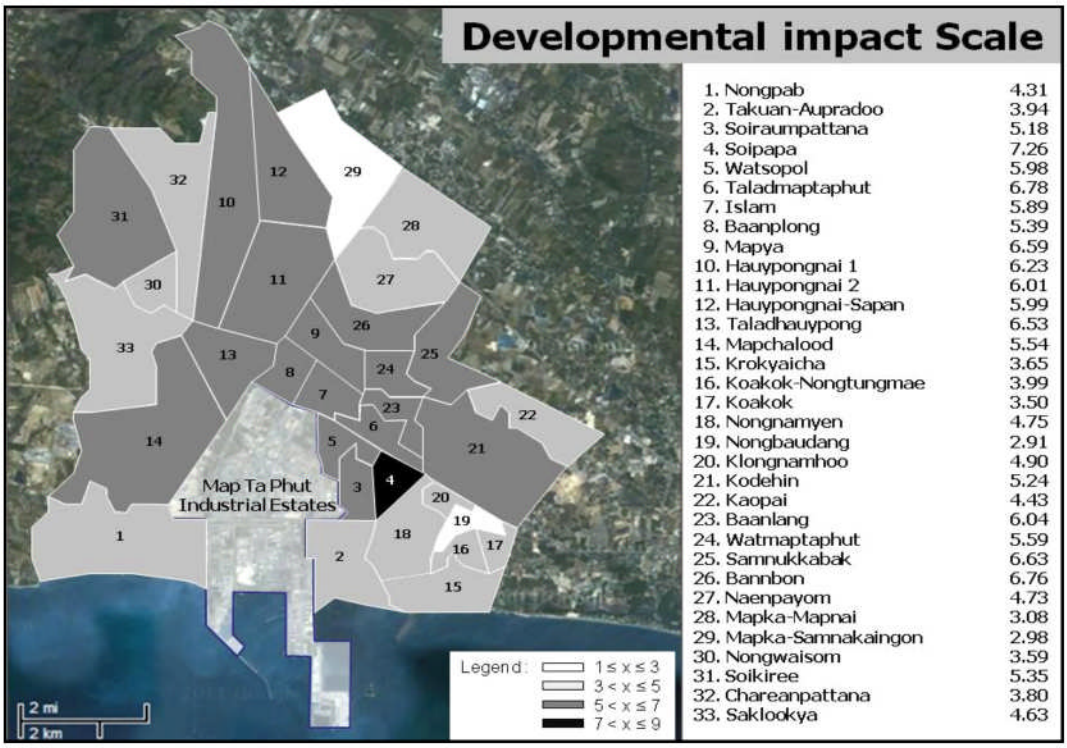

Figure 6-11: Map showing a distribution of developmental scale in MTP into a four-band greyscale. The highest average degree of residents' anxiety on developmental impact in a community shows in black (darkest) areas, while the lowest average degree of residents' anxiety on developmental impact in a community shows in white (lightest) areas.

The Figure 6-11 provides an overview of the MTP residents' perceptions of developmental impact in 33 communities. The map of the concerns over the developmental impacts such as the problems of green space, crime and traffic congestion shows that the residents in (4) Soipapa have highest concern about the developmental impacts.

6.2.5. Combined residents' perceptions of environmental impact

In summary, the quantitative results show that there is a correlation between the spatial location of communities and the residents' perceptions of the importance of EMS linked regarding practices air pollution, wastewater and industrial impact. However, the analysis found no significant difference in the residents' perceptions of developmental impact between the near and far groups. The study combined the four environmental aspects (air pollution, wastewater, industrial impact and developmental impact) as a single scale to provide an overview of residents'

perceptions of the environment. Anxiety over environmental impacts indicates that residents in the darkest areas e.g. (4) Soipapa and (6) Taladmaptaphut have highest anxiety on the combined environmental impacts (Figure 6-12). However, this map is limited by the lack of information about the weights of the four environmental aspects. It was based on an average value of the degree of anxieties of four environmental impacts. Therefore, the result needs to be interpreted with caution.

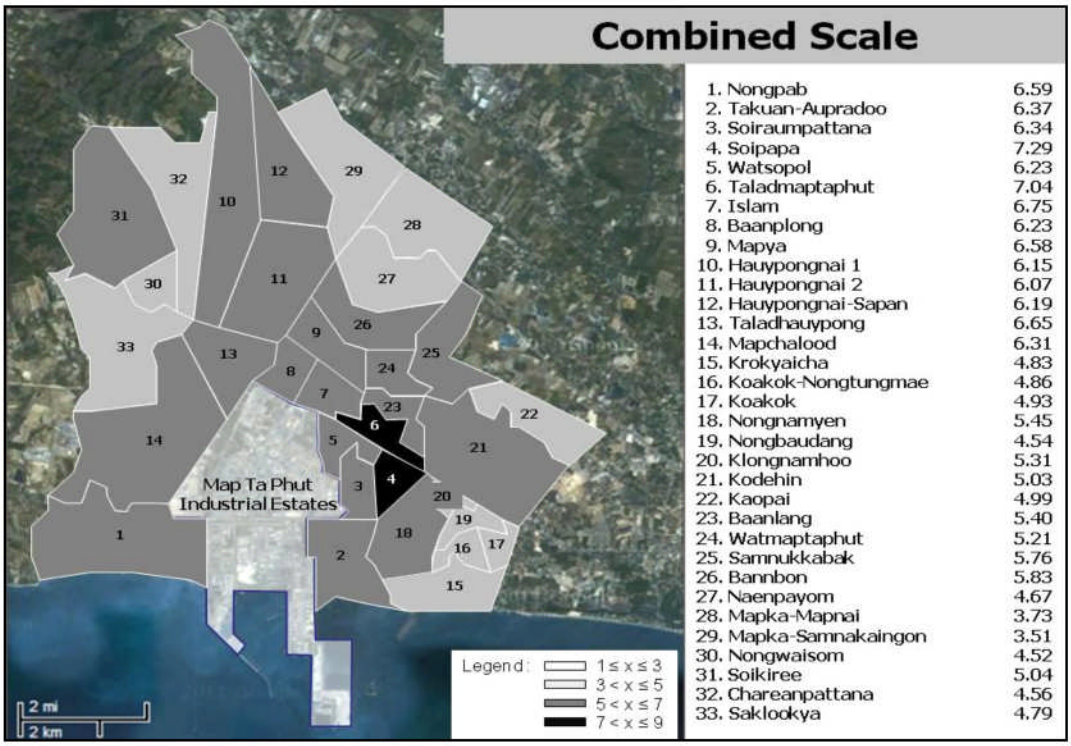

Figure 6-12: Map showing a distribution of combined residents' perceptions of environmental impacts in MTP into a four-band greyscale. The highest average degree of residents' anxiety on environmental impacts in a community shows in black areas, while the lowest average degree of residents' anxiety on environmental impacts in a community shows in white areas.

The results in this section provide important insights into the residents' perceptions of the environment and the EMS in MTP. The next section presents an analysis of the qualitative results.

6.3. Analysis of qualitative results

This section presents the results of the qualitative analysis of the outputs of the focus group discussions. The analysis provides deeper insight into the MTP residents' perceptions of the environment, which is used to support the quantitative results. Two focus group discussions were set up to compare the perceptions of MTP residents from different spatial backgrounds. Firstly, 12 MTP residents who participated in the questionnaire survey were invited to provide their views on the environment in the two focus groups. Six participants represented a group of residents who live in a community within five kilometres from the MTP industrial estate; another six participants represented a group of MTP residents in communities farther away from the industrial estate. The findings may be not representative of the general population, but investigated sophisticated issues in a cross-section comparison of the MTP residents. The discussions lasted about 30 minutes and were characterised by a semi-structured interview schedule consisting of five parts:

- How do you feel about the environment in MTP?
- What are the most important environmental impacts and problems in MTP
- What are the causes of environmental problems in MTP?
- What aspects of environmental management in MTP do you think is important?
- What suggestions are there to improve the environmental quality in MTP?

At the beginning of the focus group, participants discussed what they perceived to be the main environmental problems in MTP. Participants were requested to share their views and attitudes towards environmental impacts and about environmental quality in MTP. The discussions from the focus groups were analysed within a qualitative data analysis programme, QSR NVivo 9. The programme was used to analyse and count the frequency of the words mentioned by the participants. A word frequency query or Word Cloud helps in visualising the most frequently mentioned words, in which the different font sizes of each word represent the frequency with which the words are mentioned. For example, the word "air" is the most frequently used word which could be mentioned as "air pollution" and "air quality".

Figure 6-13: Results from the Word Cloud presenting the most frequently mentioned word from the near and far groups, more frequent mentioned words are displayed in a bigger font size.

Thematic analysis is a method for identifying and analysing patterns (themes) within the qualitative data. (Braun & Clarke, 2006). The results from the Word Cloud provide an overview of the patterns of participants' responses which help in establishing the themes of the discussion (Figure 6-13). To establish themes, this stage involves classifying the responses and summarising the relationship among the responses. Then the responses are coded under the appropriate theme. For example, a response given by a participant in the near group was coded as follows:

Air pollution is an important problem. [Problems on air pollution] *We [the residents] don't understand [air pollution control] technology, but we believe that having green area can reduce air pollution. We want more green spaces in MTP.* [Suggestions on developmental impact management] *The green spaces will improve air quality in the area within 10 – 20 years. It will help in the long run.*

Two codes were identified from the response. Some responses were based on a single theme. For example, a response from a participant in the near group '*Actually, I want to see an environmental management in all aspects. MTP really needs an integrated environmental management'*, was coded as "Suggestions on all aspects".

In the study, there were six main themes and thirteen subthemes (Table 6-10). These themes and subthemes were used in the coding process and in making interpretations of the participants' responses in the focus group discussions. It helped me to see how

the data fitted together and to generate a framework for the analysis. The data were crosschecked to ensure that all responses were captured and the responses were relevant to the themes and subthemes.

Table 6-10: The number of participants' responses from the focus group discussions

Environmental issues	Near	Far	Total
Air pollution	16	6	22
- Problems on air pollution	10	5	15
- Suggestions on air pollution management	6	1	7
Wastewater	3	2	5
- Problems on wastewater	2	-	2
- Suggestions on wastewater management	1	1	2
- Satisfaction on wastewater management	-	1	1
Industrial impact	5	3	8
- Problems on industrial impact	4	1	5
- Suggestions on industrial impact management	1	2	3
Developmental impact	7	7	14
- Problems on developmental impact	4	3	7
- Suggestions on developmental impact management	3	4	7
All aspects	5	-	5
- Problems on all aspects	2	-	2
- Suggestions on all aspects	3	-	3
Other aspects	5	1	6
- Expect more responsibility on operational area	1	-	1
- Perceptions of PTT as a large company	4	1	5
Total number of problems, suggestions and satisfaction	41	19	60

6.3.1. Descriptive perceptions of air pollution

Most participants in the near and far groups seemed to have answers in their minds and expressed their perceptions on air pollution problems in MTP. The majority of participants from the near and far groups (36.7% of a total 60 comments) indicated that air pollution is the main environmental problem in MTP. The participants started the discussions by complaining about the air pollution management in MTP, and most of them showed their concerns over the impacts of air pollution. For example, the participations' from the near and far groups made a number of comments about the effect of air pollution over the quality of natural water resources. The participants' concern was about the effects of high concentrations of air pollutants

such as nitrogen oxide, sulphur dioxide and volatile organic compounds (VOCs) on the quality of the water supply in MTP. The participants believed that air pollution causes acid rain problems and subsequent water supply contamination.

"Acid rain, which affects the quality of water supply, is caused by air pollutants. It gets into water supplies and the pH level of the water is getting lower. I had measured the pH value of a river in MTP was 4.8". (Hauypongnai 1 resident (10), near communities group)

"Air pollution problem affects the quality of water supply. Air quality and water supply need an integrated management. When the atmosphere contains a large amount of air pollutants such as VOCs, the air pollutant reacts with the water content in the atmosphere and produces the contaminated precipitation. The contaminated rain seeps into the ground and contaminates the water supply". (Saklookya resident (33), far communities group)

Whilst the effect of air pollution on the quality of the water supply in MTP was a common perception amongst participants in the near and far groups, there were differences in the details and ratios of comments on air pollution between the two groups. The participants from near communities tended to show more worry at health impacts from air pollution than the participants from far communities. The participants in near communities group made 16 comments (26.7%) about air pollution which is considerably higher than six comments (10%) in the group of far communities. A number of the comments in the near group indicated that they have concerns about the effects of air pollution on their health. The participants believed that breathing polluted air can be a major cause of cancer and respiratory diseases.

"Watsopol community usually experienced bad smells from the industrial estate. Sometimes it happens two or three times a week and we cannot identify where the smell is from. It depends on the wind direction, but the smell stinks". (Watsopol resident (5), near communities group)

"This concerns our children who are not grown up enough to take care of themselves. They have to breathe [air pollution] every day". (Baanplong resident (8), near communities group)

"Air pollution management is very important. We have to breathe [air pollution] every day. Now, many residents in MTP had died of cancer". (Nongpab resident (1), near communities group)

In summary, approximately one third of the total comments from the near and far groups indicated concern over air pollution. The major difference in the perception of air pollution between the near and far groups is that a majority of the participants from near communities expressed their anxiety about health impacts from air pollution because they believed that air pollution causes cancer and respiratory diseases. However, there were also a number of comments from the near and far groups of residents on their concerns about the effects of air pollution on the quality of the water supply in MTP. While the anxiety over the impacts of air pollution was the most frequently mentioned topic, a range of other environmental problems, such as wastewater, industrial impact and developmental impact were mentioned.

6.3.2. Descriptive perceptions of wastewater

There were five comments (8.3%) about wastewater management and water supply out of the total 60 comments. In the near communities group, participants made three comments (5%) on the topic of wastewater. They thought that the industry should take more responsibility for its wastewater management. The participants had had a bad experience when making complaints about the problem of wastewater management to the industrial sector in MTP. One participant from a community adjacent to the sea also witnessed illegal wastewater discharge to natural water resources.

"When someone complains [about wastewater management], the situation becomes better for a short period of time after then, the problem is back again. [The industry] promised to take the wastewater sludge away from the sea. They have been finding a contractor for three months but, there is no action taken. 90% wastewater effluent from all of the plants in MTP has been discharged into a canal in Takuan-Aupradoo next to a small fishery group. I have seen it. The plants discharged [wastewater and sludge] directly to the sea without any treatment". (Takuan-Aupradoo resident (2), near communities group)

The analysis found a notable difference in the perceptions between two groups. The participants in the far group made two comments (3.3%) about wastewater in different topics. There was one comment about water supply; the participant suggested that the industry should provide the water supply as a free of charge service to the MTP residents, to compensate for their inability to use the no-cost rainwater as a source of water, as it had been before the industry had developed in

MTP. Interestingly, one participant showed satisfaction about wastewater management in the area.

"It is unfair the way [the municipal] brings in water supply. In the past, we did not have to buy water. We used stored rainwater as a source of water supply. If someone wants to solve this [water supply] problem, they need to provide free water. Residents in MTP must get free tap water." (Saklookya resident (33), far communities group)

"There is no problem about wastewater in MTP". (Soikiree resident (31), far group)

Comparing the responses from the two focus groups, it can be seen that there were considerable differences regarding perceptions of wastewater management between the participants in the near and far communities groups. The participants from near communities not only had many concerns about the impact of wastewater but also witnessed an illegal wastewater discharge. By contrast, the participants from far communities have few concerns over wastewater.

6.3.3. Descriptive perceptions of industrial impact

This section involves residents' perceptions of industrial impacts such as, industrial waste, light and noise pollutions. The participants from the near and far groups made eight comments (13.3%) about industrial impact. In the near communities group, the participants spoke of the impacts from such as lights and noises from the industrial estate. There were five comments (8.3%) about industrial impact during the discussion; participants mentioned their disturbing experiences with bright lights and loud noises from industrial operations. The residents in near communities complained that they are adversely affected by the industrial impact, including light and noise pollutions, particularly during the night.

"During [gas separation plants] normal operation, flare gas stacks make a loud noise and very bright light particularly in the night time. It is very annoying and we [the residents] feel frightened". (Baanplong resident (8), near communities group)

"The industrial operations create very bright light during the night. It is so bright. I cannot sleep all the night". (Takuan-Aupradoo resident (2), near communities group)

The participants in far communities voiced different concerns over industrial impacts and made three comments (5%) about industrial waste management. They had anxieties about illegal industrial waste dumping and pointed out that irresponsible industrial waste subcontractors could be a problem.

"Many incidents of illegal industrial waste dumping have been found in MTP. It is because the [industrial waste management] companies don't care. The companies don't have their own [industrial waste collection] trucks. The company hires a truck from a subcontractor to collect and transport to its [industrial waste management] site. The companies must use GPS tracking to control these [subcontractor] trucks". (Chareanpatana resident (32), far communities group)

The focus group results revealed considerable differences in perceptions between the two groups. The main concerns of participants from near communities are the effects of industrial operations in the area such as bright lights and loud noises. Their experience of light and noise pollution was especially unpleasant during the night time. On the other hand, the participants from far communities had different concerns; they had anxieties over industrial waste management and had witnessed many incidents of illegal industrial waste dumping in MTP.

6.3.4. Descriptive perceptions of developmental impact

This section studied the participants' perceptions of the impacts of the development in MTP. It involves the consequences of high population growth in MTP. The effects of the development relate to the issues of crime, green space, municipal waste and traffic congestion. There were a total of 14 comments (23.3%) about the impacts of development in MTP with equal numbers of comments (7 times) made in the near and far groups.

"The traffic congestion is getting worse especially during the peak hour, in the morning and evening". (Soikiree resident (31), far communities group)

"I'm worried about personal safety and property security as well as crime. It is because there are too many people [migrated] here. I'm also worried about traffic congestion". (Watsopol resident (5), near communities group)

"Domestic waste is a big issue in MTP. The municipal just cannot handle it because MTP produces so much household waste". (Mapka-Mapnai resident (28), far communities group)

There were a number of comments in the near group about the lack of green space. The participants from near communities felt that there are not enough green spaces in MTP and they want to increase green spaces in the area. Interestingly, the participants believed that green spaces could improve the air quality in MTP and would provide great benefits to the environment in the future.

"I believe that having green spaces can improve air quality in MTP. It'll be good, if we have more green spaces". (Watsopol resident (5), near group)

"Air pollution is an important problem. We [the residents] don't understand [air pollution control] technology, but we believe that having green spaces can reduce air pollution. We want more green spaces to improve air quality in MTP within 10 – 20 years. It will help in the long run". (Mapchalood resident (14), near group)

The focus group results showed that there are a number of similarities between the perceptions of developmental impact between the participants from near and far communities. The participants from the near and far groups have anxiety over crime, municipal waste and traffic congestion in the area. However, the participants from near communities want to improve green space because they believe that the green space can improve air quality in MTP.

6.3.5. Other aspects of residents' perceptions

The participants from near communities voiced their needs for integrated environmental management in all aspects; five comments (8.3%) mentioned the need for integrated management. One participant had doubts about the current emission standards, believing that more stringent emission standards are required to control the emissions from the industry in MTP.

"Actually, I want to see an environmental management in all aspects. MTP really needs an integrated environmental management". (Watsopol resident (5), near communities group)

"The [current] criteria for pollutions management and emission standard must be changed. A new set of criteria for emission standards [for all pollutions] is needed for the area [MTP industrial estate]. The [new] criteria must take into account all industrial plants and the total emissions from every emitter in MTP. The emission standards being used at this moment are just not acceptable". (Mapchalood resident (14), near communities group)

There was a topic about their perceptions of PTT that emerged during the two discussions. They perceived PTT as a large company and expected the company to be more responsible in improving the quality of the environment in MTP. The participants supposed that PTT should place more emphasis on the environmental management within its operational area rather than in other parts of country.

"I live near by the industrial estate. In my view, PTT is a large company. I want to see that PTT recognises social and environmental responsibilities as important issues. I think the environmental management of PTT should consider the operational area as the first priority. PTT has to keep the environment surrounding its operational areas in good condition before it can develop the quality of environment in other parts of country". (Baanplong resident (8), near communities group)

"PTT is a large company. There are many subsidiary companies of PTT group in MTP. I want to see that the PTT group manage their domestic waste by themselves. I want PTT to set up a smokeless waste incinerator to manage the domestic waste in MTP". (Mapka-Mapnai resident (28), far communities group)

There were intriguing topics that emerged in a group of residents from near communities. The participants expected an integrated environmental management from the industry and doubted whether the current emission standards are stringent enough. Moreover, the participants from the near and far groups perceived that, as a large company, PTT is expected to be more responsible in improving the quality of the environment, particularly its operation area.

6.3.6. Summary

The qualitative results established that the participants who represented residents in near communities have more anxiety over environmental impacts (i.e., air pollution, wastewater and industrial impact) than participants from far communities. The analysis of the focus groups responses helps to understand the details of residents' perceptions of the environment and provides substantial support for the quantitative results.

Figure 6-14: Results from the Word Cloud presenting the most frequently mentioned word from the near group, more frequent mentioned words are displayed in a bigger font size.

In the session with residents of near communities, the participants expressed their anxieties over air pollution; the participants strongly believe that air pollution is a major threat to the MTP residents' health. They not only think that air pollution is linked to an increased risk of cancer and respiratory disease but also want to improve green spaces to improve air quality in MTP. The participants from near communities have a negative perception of wastewater management because of a delay in responding to their complaints. They also have unpleasant experiences, light and noise pollutions, from the operation of industrial plants in MTP, particularly during the night time. Moreover, participants from near communities want the industrial sector to integrate its EMS to manage all environmental aspects and want more stringent emission standards to be regulated in MTP.

Figure 6-15: Results from the Word Cloud presenting the most frequently mentioned word from the far group, more frequent mentioned words are displayed in a bigger font size.

In contrast, participants from far communities showed their lack of concern over wastewater management. They also did not have any issue about light and noise pollution. They were primarily concerned about the effect of development in MTP such as traffic congestion, crime and municipal waste. However, there are a number of similarities between the two groups. The participants from the near and far groups believe that air pollution causes acid rain and have concerns about the effects of air pollution on the water supply in the area. They had also witnessed a number of incidents of illegal dumping in MTP. One participant, who lives by the sea, had witnessed an illegal wastewater discharge to the sea. Another participant from far communities witnessed to having seen many incidents of illegal industrial waste dumping in the area. The participants from the near and far groups have the perception of PTT as a large company and expect the company's responsibility to improve the quality of the environment in MTP. They think that PTT should be responsible for protecting the environment in its operational area.

6.4. Mixed methods analysis

6.4.1. Air pollution

The study found a significant difference in the participants' perceptions of air pollution management between the near and far group. The quantitative results

established that the participants from near communities have more concerns over air pollution than the participants from far communities. The result of regression analysis suggests inverse correlations between the degree of participants' anxiety over air pollution and longitudinal (-0.834) and latitudinal (-0.546) distance from the industrial estate. However, a positive correlation was found between the degree of anxiety and an absolute distance (+0.493) from a community to the industrial estate. A possible explanation for these results may be the air pollutant dispersions are influenced by wind directions which prevail from south to north.

The study found differences in the residents' perceptions not only regarding the degree of anxiety over air pollution but also different concerns over the impact of air pollution. The results obtained from the qualitative analysis showed that the participants from near communities have a tendency to worry more about health impacts from the exposure to air pollution than the participants from far communities. The participants who live in near communities have a strong belief that the high concentrations of air pollutants in the area increase the risk of respiratory disease and cancer for MTP residents. However, there was a similarity between the perceptions of air pollution between the two groups. The effect of air pollution on the quality of natural water resources is a common perception that the participants from the near and far groups mentioned in the discussions. The participants thought that air pollution causes acid rain and contaminates the natural water resources in MTP.

The distribution of the residents' concern over air pollution across 33 communities in MTP (Figure 6-5) is consistent with a considerable number of studies in MTP (Jadsri et al., 2006; Peluso et al., 2008; Pimpisut et al., 2005; Tanyanont & Vichit-Vadakan, 2012; Uapipatanakul, 2009). These previous studies found that the concentrations of air pollutants, such as nitrogen oxide, sulphur dioxide and VOCs, around the industrial estate and downwind areas are higher than other areas. The wind directions of MTP are dominated by on-shore winds from south to north. In the area of MTP, communities which locate adjacent to the industrial estate and downwind areas have higher concentrations of air pollution (Jadsri et al., 2006; Peluso et al., 2008; Pimpisut et al., 2005). The studies also found a higher rate of respiratory disease and cancer in the communities around the industrial estate and

within downwind areas (Jadsri et al., 2006; Tanyanont & Vichit-Vadakan, 2012; Uapipatanakul, 2009).

As a result, residents in adjacent and downwind communities perceive that they are exposed to a high level of air pollution and have a greater risk of respiratory disease and cancer even though they live farther away from the industrial estate than five kilometres. The effect of wind directions on air pollution dispersions may explain the correlation between the degree of residents' anxiety over air pollution and the distance. Residents in adjacent communities and downwind areas perceive that the exposure to air pollution is high and consequently have the high degree of anxiety over air pollution, although the absolute distance from their community is farther than from others. The study of the residents' perceptions of air pollution, while preliminary, suggests that the spatial backgrounds of stakeholders have an influence over their perceptions of environmental management.

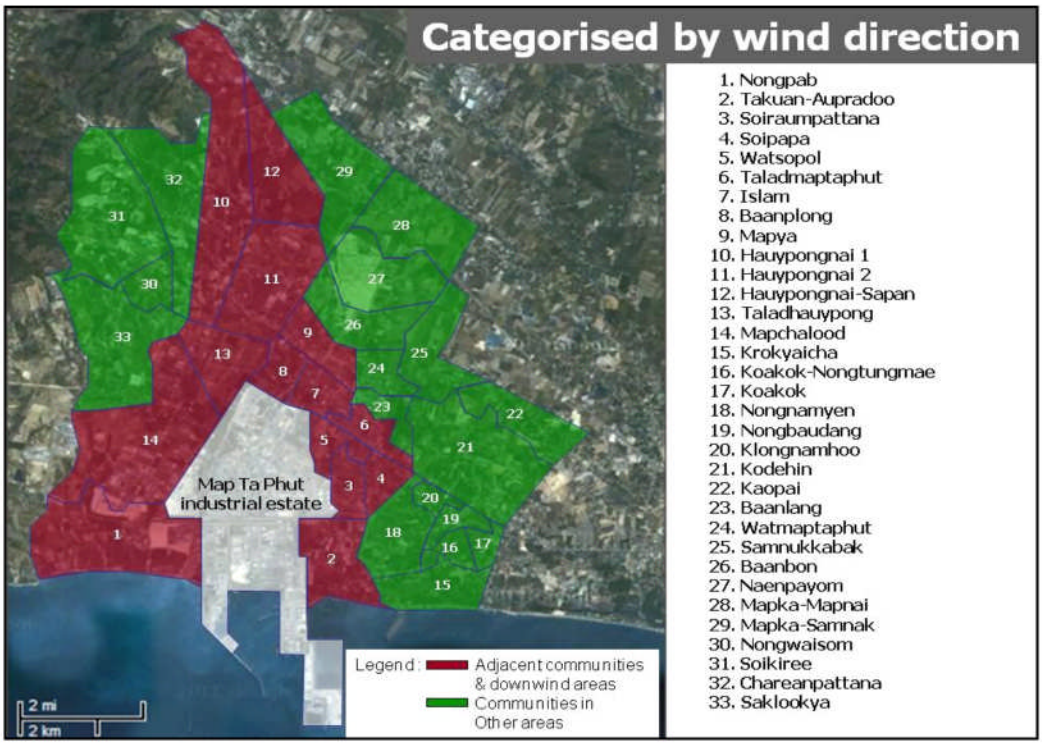

Figure 6-16: List of communities in MTP presenting 14 adjacent and downwind communities (red) and 19 communities in other areas (green).

The study investigated further the influence of spatial context on stakeholders' perceptions, by comparing the residents' perceptions of air pollution from two different groups of communities based on wind directions; adjacent and downwind communities and communities in other areas (Figure 6-16). A significant difference of perceptions between the two groups was checked by an independent sample t-test. According to the demographic of questionnaire participants, there were 190 participants living in adjacent communities and downwind areas. The other 205 participants are living in communities in other areas of MTP.

Table 6-11: The results of normality test and t-test of air pollution scale between two groups of participants which were categorised by wind direction in MTP

Air pollution	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Adjacent and downwind	190	7.6947	.42181	.986	190	.063
Other areas	205	5.5098	.64437	.987	205	.060
Independent Samples t-test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances	F		Sig.	t	df	Sig.
not assumed	34.822		.000	40.148	354.462	.000

The results (Table 6-11) indicate that the null hypothesis, normal distribution data, is accepted ($p>0.05$). The t-test result shows a significant difference of perceptions between the near and far groups of participants. The result shows that the participants from adjacent communities and downwind areas had more anxiety over air pollution than the participants from other areas in MTP ($t=40.148$, $df=354.462$, $p<0.05$). As shown in Figure 6-17, the interpretation of the result is that residents in adjacent communities and downwind areas have more concern about air pollution and think that air pollution management is more important than residents in the other areas in MTP. A resident who lives in a community even farther away from the industrial estate than five kilometres, but is located in a downwind area, has the greater degree of anxiety over air pollution than a resident who lives in a community within five kilometres from the industrial estate, but is not located in the downwind area.

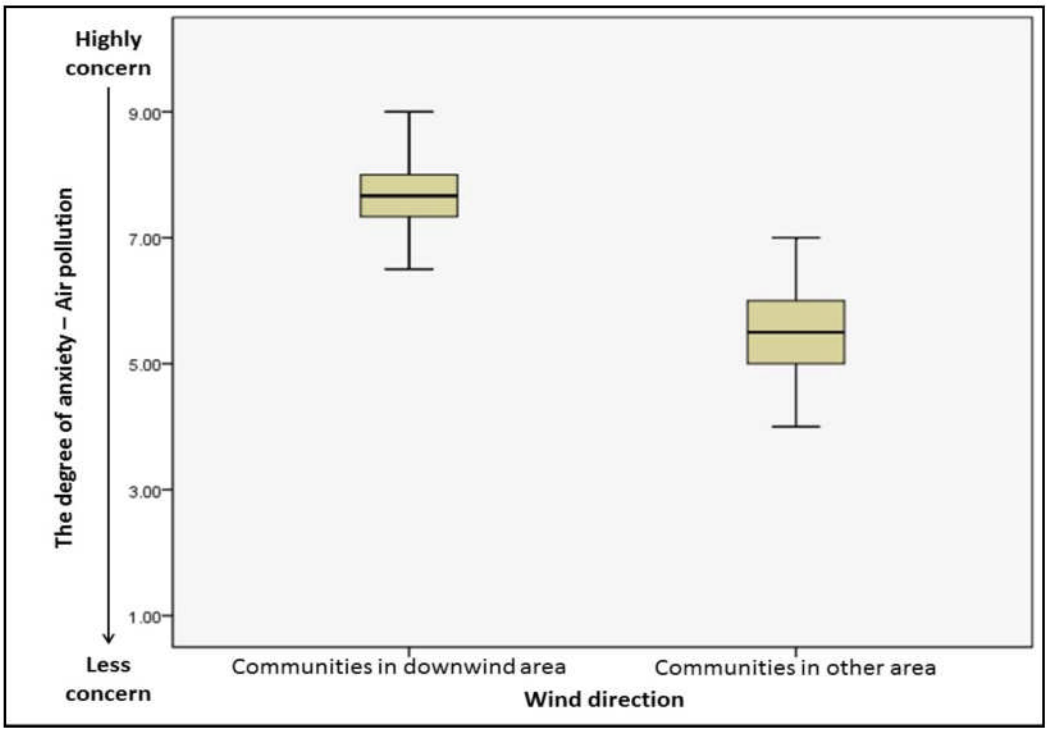

Figure 6-17: T-test result showing a comparison of air pollution scale between two groups of participants which were categorised by wind direction in MTP

The finding suggests that the Thai regulator's guideline for an environmental impact assessment (EIA) report and mitigation measures in the operational phase may not be suitable for the area. The guideline recommends a radius of assessment to be five kilometres away from an industrial site which being assessed. An implication of the finding is the possibility that a guideline of environmental impact assessment for mitigation and impact management for any particular emission should be adjusted to be suitable for the local contexts. For example, the mitigation measure of air pollution during the operational phase should take wind directions into account for defining a suitable area to assess and evaluate the impacts of air pollution, although that area is farther away from an industrial site than five kilometres.

6.4.2. Wastewater

The quantitative analysis found a significant difference of perceptions of wastewater between the participants from near communities and far communities. The t-test result shows that the residents in near communities have a higher degree of anxiety over wastewater than the residents in far communities. The regression analysis also presents an inverse correlation between the degree of anxiety over wastewater and

the longitudinal (-0.410) and latitudinal (-0.164) distances. Residents in communities located along the seashore, such as community (1) Nongpab and community (2) Takuan-Aupradoo, have the highest degree of concerns over wastewater (Figure 6-7). The analysis of focus group discussion explored views of participants who live adjacent to the sea; they appear to have a lot of concerns about wastewater because they have had bad experiences with wastewater management in MTP. The residents around the seashore not only experienced a lot of difficulty in complaining about wastewater management, but also witnessed illegal wastewater discharges in the area. As a result, they think that wastewater management is important and has to be improved. This perception differs from that of the residents from far communities who do not have concern over wastewater management but want a free water supply service from the industry. Moreover, it is found that the residents' perceptions of wastewater have a high degree of variance compared with the air pollution. A possible explanation might be that wastewater problems have an effect on natural water resources, such as the sea, rather than disperse across the area, while air pollutants can disperse across downwind communities. Therefore, the residents in communities located adjacent to the sea have a lot of concern over wastewater while residents in other near communities have few concerns.

The study found that the complaint procedure and illegal discharges are problems in wastewater management in MTP. This finding has important implications for improving wastewater management and also developing EMS. The study of stakeholders' perceptions provides useful information for an industrial organisation to evaluate its environmental performance and review its EMS. An industrial organisation can address problems in wastewater management by communicating with its stakeholders, particularly residents who live near natural water resources, and who are likely to have a lot of concern over the impacts of wastewater.

6.4.3. Industrial impact

The study found not only a significant difference in the degree of anxiety over industrial impact but also different aspects of concern about the industrial impact between participants from near communities and far communities. The quantitative results indicated that the participants from near communities have a higher degree of

anxiety than the participants from far communities. The qualitative analysis also revealed that participants from the near and far groups perceive the impacts of the industrial estate differently. This study has shown that MTP residents from different communities have different perceptions of the industrial impact. It suggests that the spatial backgrounds of local stakeholders have an influence on their perceptions of the effects of the industrial estate.

These results may be explained as residents from different communities have different experiences of a particular environmental impact which influence their perceptions. The qualitative analysis found that participants in the two focus groups have different experiences of the industrial impact in MTP. The effects of the industrial operations in MTP, such as bright lights and loud noises, are the major concern of the participants from near communities particularly those located adjacent to the industrial estate. The participants in adjacent communities told stories about their disturbing experiences with the light and noise pollutions during the night. Participants from far communities worry about industrial impact in a different way; they have anxieties about illegal industrial waste dumping in MTP because they were witness to many incidents of illegal dumping. Therefore, it is found that the residents' perceptions of industrial impact in near communities have a higher degree of variance compared with the far communities.

As can be seen from the results, the experiences of local stakeholders provide crucial information for an industrial organisation to pin down its problems in EMS. The mixed methods used in the study may be applied to obtain adequate information from local stakeholders for identifying the problems and improving the system. The quantitative method provides an overview of the degree of anxiety over environmental impact; it could help an industrial organisation to determine the area for collecting stakeholders' feedback. The qualitative approach offers an effective way of exploring stakeholders' perceptions and obtaining stakeholders' experiences of environmental impact to improve an EMS.

6.4.4. Developmental impact

Although the quantitative analysis did not find a significant difference in the degree of anxiety over the effects from the development in MTP between the participants from near communities and far communities, the qualitative results showed a difference in opinions on green areas. In particular the participants from near communities were voicing a request for an increase the number of green areas in MTP because they believe that it could improve air quality in the area.

The distribution of residents' concerns over the developmental impact, such as crime and traffic congestion, is consistent with main roads and intersections in MTP (Figure 6-11). The study investigated further the influence of spatial backgrounds of stakeholders over their perceptions of developmental impact by comparing the residents' perceptions from two different groups of communities; communities along main roads and communities in other areas (Figure 6-18).

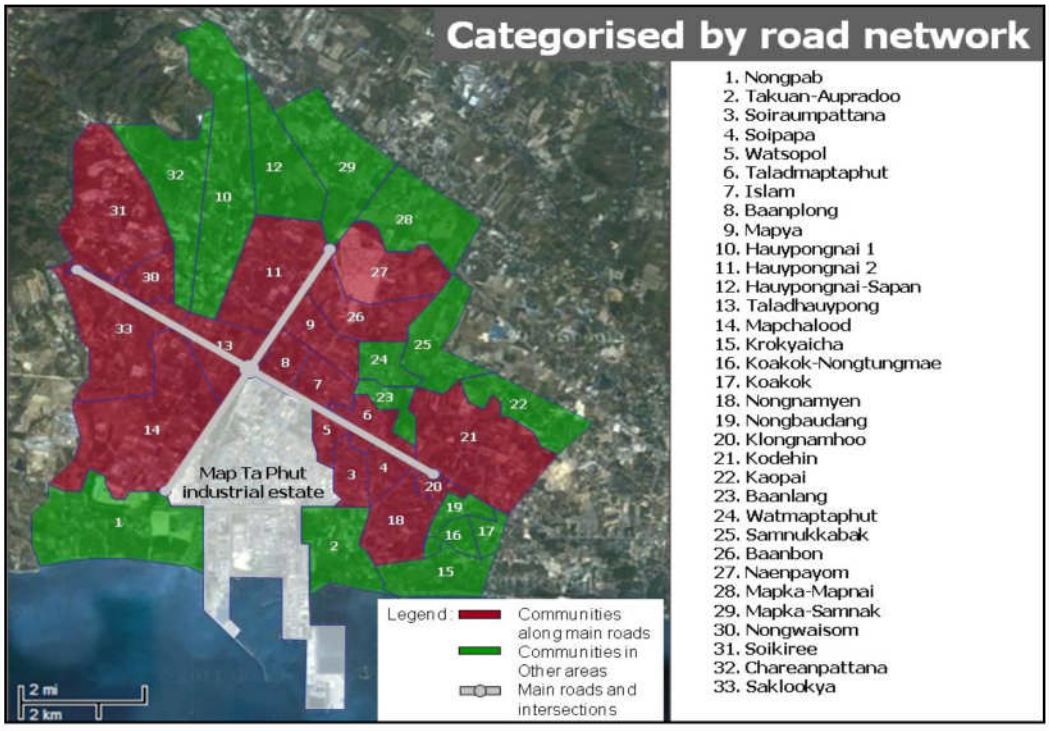

Figure 6-18: List of communities in MTP presenting 18 communities along main roads and intersections (red) and 15 communities in other areas (green).

According to the questionnaire survey, there were 235 participants who live along the main roads in MTP; the other 160 participants live in communities in the other areas of MTP. A significant difference of perceptions between the two groups was checked by an independent sample t-test.

Table 6-12: The results of normality test and t-test of developmental scale between two groups of participants which were categorised by main roads in MTP

Developmental impact	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Communities along main roads	235	5.6298	1.56937	.990	235	.104
Communities in other areas	160	4.6086	1.74258	.984	160	.054
Independent Samples t-test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances assumed	F		Sig.	t	df	Sig.
	3.052		.081	6.069	393	.000

The results (Table 6-12) indicate that the null hypothesis, normal distribution data, is accepted ($p>0.05$). The t-test shows a significant difference of perceptions between the near and far groups ($t=6.069$, $df=393$, $p<0.05$). The result shows that the participants from a community along the main roads had more anxiety over the impact of development than the participants from other areas in MTP (Figure 6-19).

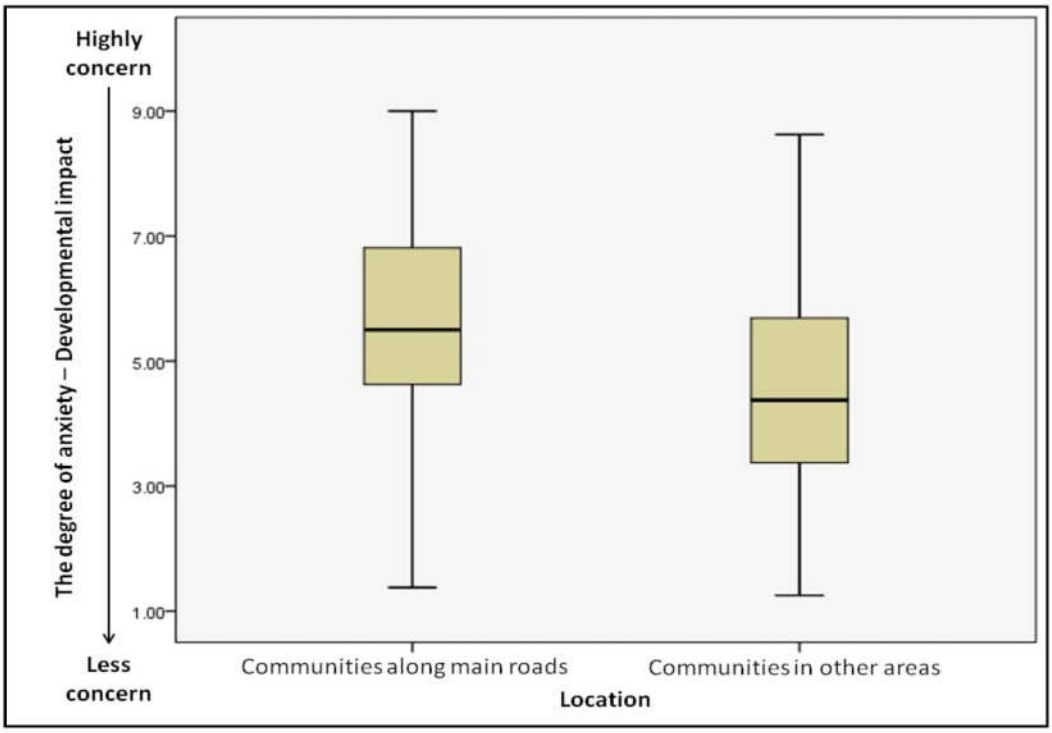

Figure 6-19: T-test result showing a comparison of developmental impact scale between two groups of participants which were categorised by main roads in MTP

This finding further supports the idea that the spatial backgrounds of stakeholders have an influence over their perceptions of environmental impacts. The interpretation of the result is that residents in communities along main roads have more concern about developmental impact than residents in the other areas in MTP. A resident in a community along main roads, even farther away from the industrial estate than five kilometres, has the greater degree of anxiety over developmental impact than a resident who lives in a community within five kilometres but not located along main roads. A possible explanation for this might be that residents in a community along main roads perceive the impacts of development, such as traffic congestion, are high in their community and feel that they are adversely affected by the developmental impact. However, this analysis is limited by the lack of information about the main roads and intersections in the study area. The analysis was based on a preliminary database of the road network in MTP. This result therefore needs to be interpreted with caution. Further studies on the current topic are recommended for investigating the influence of spatial context on the residents' perceptions of developmental impact by obtaining more a comprehensive database of the road network.

6.4.5. Combined environmental impact

The study combined the degree of anxieties of the four environmental aspects (air pollution, wastewater, industrial impact and developmental impact) as shown in Figure 6-12. However, the map of the concerns over the combined impacts was based on an equal-weight basis for the four environmental aspects. The study attempts to provide a more accurate map of residents' concerns by weighting the four environmental aspects from the numbers of participants' responses from the focus group discussions (Table 6-10). The degree of anxiety on a combined impact can be calculated by the equation below.

$$Combined\ scale = [22(Air\ poll) + 5(Wastweater) + 8(Ind\ impact) + 14(Dev\ impact)]/_{49}$$

For example, community (1) Nongpab has the degree of anxieties over air pollution, wastewater, industrial impact and developmental impact at 7.87, 8.42, 5.77 and 4.31 respectively. Therefore, the community has the degree on anxiety on combined impact equal 6.57

$$Combined\ scale\ for\ (1)Nongpab = [22(7.87) + 5(8.42) + 8(5.77) + 14(4.31)]/49 = 6.57$$

As shown in Figure 6-20, anxiety over combined environmental impacts suggests that residents in the darkest areas e.g. (4) Soipapa and (6) Taladmaptaphut have the highest anxiety over the environmental impacts. It may be that these residents have more concern over adverse effects from air pollution, wastewater and industrial impact as these communities are located within five kilometres and perceive the impacts of development because their communities are located along the main roads. It is found that the degrees of anxiety of 30 communities increase by between 1-11% compared to the combined scale from quantitative results (equal-weight basis). For example, community (15) Krokyaicha, (16) Koakok-Nongtungmae and (17) Koakok increased their anxiety about 4%. The highest increase in degree of anxiety is found in community (29) Mapka-Samnakaingon, up by 11%, from 3.51 to 3.91 and is the

community which has the lowest degree of anxiety on the basis of quantitative analysis. It is difficult to explain this result, but it might relate to the weighting factor from the qualitative results.

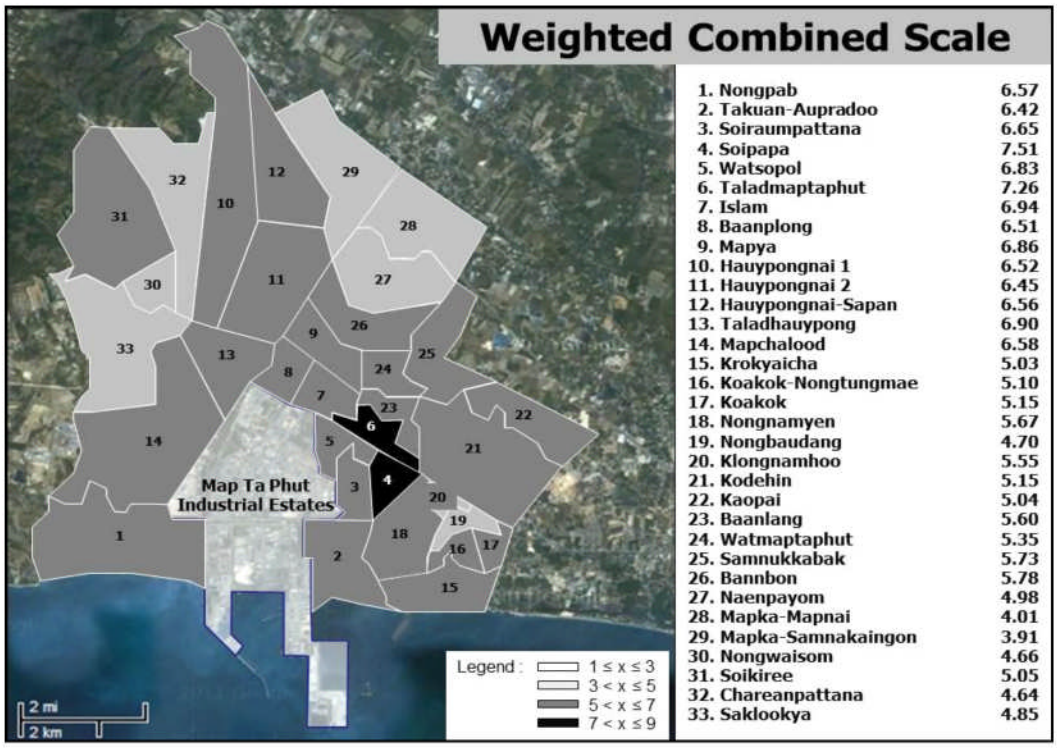

Figure 6-20: Map showing a distribution of weighted combined residents' perceptions of environmental impacts in MTP into a four-band greyscale. The highest average degree of residents' anxiety on environmental impacts in a community shows in black areas, while the lowest average degree of residents' anxiety on environmental impacts in a community shows in white areas.

The mixed methods approach offers an alternative way to interpret the residents' perceptions of environmental impacts and provides an overview of anxiety over environmental impacts surrounding an industrial estate.

6.5. Discussion

This study was designed to determine the influence of the spatial backgrounds of stakeholders on their perceptions of environmental management and impacts. The study has revealed that the stakeholders' perceptions of environment vary between communities across the MTP area. The study indicates that residents in a community where they perceive that the effect of a particular environmental aspect is high are likely to have a high degree of anxiety over the particular emission, and feel that the environmental management of the emission is important. The study shows that residents in communities adjacent to and communities downwind from the industrial area perceive that they are exposed to a high level of air pollution and have a greater risk of respiratory disease and cancer. Therefore, they have a greater degree of anxiety over air pollution and think that air pollution management is more important than the residents who live in other areas of MTP. Similarly, residents who live within five kilometres feel that there are a lot of problems about wastewater and industrial impact in their communities and consequently have a higher degree of anxiety about wastewater and industrial impact than residents from far communities. The study also shows that residents in communities along main roads perceive the impacts of development such as crime and traffic congestion are high in their communities, and accordingly, they have more concern over developmental impact than residents from other areas. Hence, the spatial backgrounds of stakeholders have a strong influence on their perceptions.

The mixed methods used for the study may be applied to acquire local stakeholders' perceptions, not only to identify the problems of EMS but also to improve an EMS. The quantitative method can provide an overview of the degree of anxiety over a particular environmental impact to determine suitable areas for collecting stakeholders' perceptions of EMS. The qualitative approach is an effective way for an industrial organisation to explore stakeholders' perceptions and experiences of environmental impact for improving its EMS. The findings may not be representative of the general population, but investigate sophisticated issues in a cross-section comparison of MTP residents. The results of qualitative analysis provide a substantial support for the quantitative results. The analysis of qualitative data concludes that residents have different perceptions of environmental

management and environmental impacts, depending on where they live. These differences can be explained by the fact that residents from different communities have different experiences of a particular environmental impact which influence their perceptions of the environmental impact. For instance, the residents who live around the seashore not only experienced a lot of difficulty in complaining about wastewater management but had also witnessed illegal wastewater discharges in the area. Furthermore, the residents in near communities have unpleasant experiences with the industrial impacts, light and noise pollution. At the same time, the residents from far communities have an anxiety about industrial waste management because they had witnessed many incidents of illegal industrial waste dumping in MTP. These findings further support the hypothesis that stakeholders' perceptions of environment are influenced by their spatial backgrounds.

6.5.1. Spatial context awareness in EMS

The evidence from this study suggests that an industrial organisation should integrate spatial context into its EMS. The EMS of an organisation should be designed to incorporate spatial awareness and be managed around its operational area by integrating a geographic information system into its mitigation measures and monitoring procedures. It can be seen from the study that the experiences of local stakeholders provide indispensable information for an industrial organisation to pin down its problems in EMS. As previously mentioned, stakeholders' perceptions of the environment can help an industrial organisation by pointing out the local environmental problems (Reed, 2008). For example, an industrial organisation can address problems in wastewater management by communicating with its stakeholders in a community where the degree of anxiety over the impacts of wastewater is high. Furthermore, the study of stakeholders' perceptions also provides useful information for an industrial organisation to evaluate its environmental performance and review its EMS. An industrial organisation can evaluate its environmental performance by collecting the stakeholders' perceptions of a particular emission from a community where the residents perceive the impact of that emission as high. For instance, if an organisation launches an air emission reduction campaign, it can evaluate the campaign by paying extra attention to voices from residents who have concerns over air pollution. The communication with the

local stakeholders can provide vital information for an industrial organisation to evaluate its environmental performance and improve its EMS. Therefore, the study recommends that EMSs need to be able to collect and interpret the spatial data of stakeholders' perceptions to the system and database.

6.5.2. Responsibility beyond boundary and regulation

The environmental responsibility of an industrial organisation should be beyond its factory boundary and legal requirements. MTP residents perceive that, as a large company, PTT is expected to accept great responsibility for improving the quality of the environment surrounding its operational area. The residents feel that there are a lot of environmental problems in MTP and that integrated environmental management is needed to cope with every environmental aspect. The study also found a number of interesting topics which may help the industry to develop a more appropriate EMS. A number of residents not only expect an integrated environmental management for all environmental aspects but also have doubts about the current emission standards. There are several possible explanations for these findings. First of all, the MTP residents had witnessed many violations, such as illegal dumping of wastewater and industrial waste in the area. They pointed out that the waste management of an industrial organisation by irresponsible subcontractors could be a main cause of the problem. An industrial organisation should extend the environmental responsibility beyond its factory boundaries due to the reputational risks, which could be affected by subcontractor misconduct (Leppelt, 2014). The study suggests that an industrial organisation should have procedures that ensure the subcontractors have sufficient skills and responsibilities to handle waste safely, in order to avoid fatal incidents until the final disposal such as incinerator or landfill site without risks to health and safety.

Another possible explanation for the doubt of the environmental regulation is that the Thai regulator's guidelines for an environmental impact assessment (EIA) report may not be suitable. A five-kilometre distance is a recommended radius for an EIA report and follow-up monitoring reports in Thailand. However, the results of this study suggest that a guideline of environmental impact assessment and mitigation

management for any particular emission should be adjusted to suit the local context. For example, the environmental impact assessment, mitigation measures and monitoring plans of air pollution should take wind directions into account for defining the boundary of areas to assess and evaluate the impacts of air pollution. Simply applying a geometric distance of five kilometres from an industrial site is not sufficient. As supported by the current finding, a resident who lives in a community even farther away from the industrial estate than five kilometres, but located in a downwind area, has a greater degree of anxiety over air pollution than a resident who lives in a community within five kilometres not located in a downwind area. Furthermore, the study also found that residents in a community along main roads, even farther away from the industrial estate than five kilometres, have a higher degree of anxiety over the impact of development; such as traffic congestion and crime, than residents who in live a community within five kilometres but not located along main roads. As a result, an industrial organisation should expand its environmental management, mitigation measures and monitoring systems beyond compliance with the environmental regulations to continuously improve its environmental performance (Harper Ho, 2013).

As previously mentioned, the reliability of database and environmental information in MTP is still questionable. It is probable that the study of local stakeholders' perceptions of environment could be an alternative way to deliver useful information for an industrial organisation to evaluate its environmental performance and develop its EMS instead of relying on only an unreliable environmental database. The spatial background analysis can help an industrial organisation gaining an overview the distribution of degree of anxiety over environmental impact in its operational area and identifying suitable stakeholders in order to collect their perceptions for developing its EMS. A lack of trust in environmental information, environmental management and decision-making processes can raise public concerns and be a challenge for the environmental regulators (Gouldson, 2004).

6.5.3. Limitations and future research

The current study has only examined the perceptions of the MTP residents which are only one of many groups of stakeholders in the MTP area. In future research, it

might be possible to investigate perceptions of other stakeholders, such as local government and policy makers. The perceptions of the regulators could be useful for improving environmental management in the area. It could be possible to tackle the problems of the emission standards and the guideline for environmental impact assessment and management in the area. Further research might investigate regulators' perceptions of the environment for a better understanding of the environmental problems in the area (Figure 6-21). Two-way communications to local communities and regulators could help an industrial organisation in reviewing its environmental policy and improving the EMS instead of following only the internal cycle of continuous improvement from EMSs' guideline.

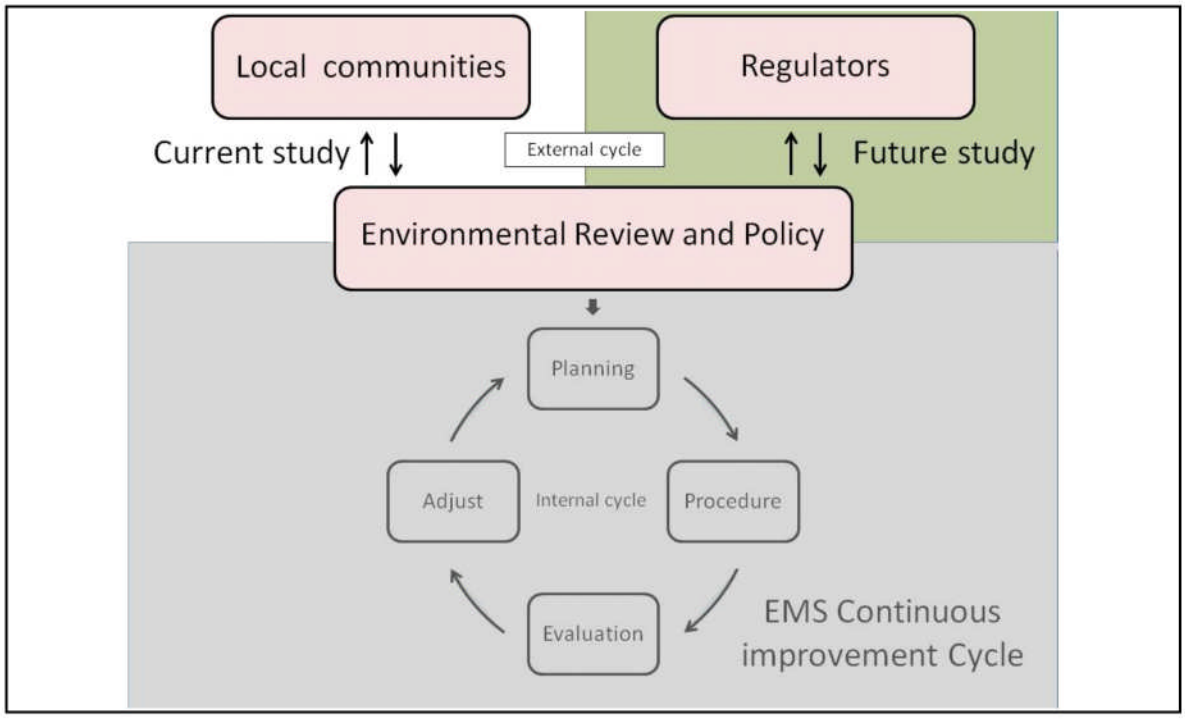

Figure 6-21: Diagram showing the area of the current study that focuses on the involvement of local stakeholders and recommended area of the future study on the involvement of regulators in the hatched area.

By entering into dialogue with local stakeholders, an industrial organisation can not only adjust its EMS to solve the existing environmental problems from the past, but also develop its EMS to prevent possible problems in the future. The involvement of stakeholders is vital for an organisation not only to improve its EMS but also to

enhance its reputation in the area (Kollman & Prakash, 2002; Reed, 2008). However, the industry has been struggling to engage its stakeholders, either in presenting its environmental information or collecting stakeholders' perceptions of environment. It can therefore be assumed that an effective communication between an industrial organisation and its stakeholders is necessary to share environmental information with its stakeholders and obtain the stakeholders' perceptions of environment. Further work is required to investigate how to communicate with the local stakeholders effectively for reducing the environmental information gaps between the industry and its stakeholders. Realising this, the next chapter investigates how to improve effectiveness of the communication between the industry and its stakeholders.

6.6. Conclusions

The study emphasises that there are significant differences in the perceptions of the environment among the MTP residents, and that there is a tendency for the residents in communities, where their concerns of a particular environmental impact is high, to think that the environmental management of the impact is important. The study indicates that the MTP residents in near and downwind communities have greater concerns about the impact of air pollution and believe that the air pollution management is important. The results show that the residents in communities located along the seashore have a higher degree of concern over wastewater than residents in the other areas. The results also indicate that the residents in communities located adjacent to the industrial estate have more concerns about industrial impact than residents in farther communities. The findings suggest that the residents in communities located along the main roads in MTP have many more concerns about the effects of the development, such as traffic congestion and crime, than residents in the other areas. It can be seen from the study that different communities surrounding MTP have different perceptions of the environment, and therefore it is important to take these understandings from the spatial background analysis into account in the process of EMS development and improvement.

7. Stakeholder analysis for improving Public Participation

This chapter aims to address how stakeholders' backgrounds influence their engagement with environmental information in public participation. In the study, the effectiveness of public participation is measured by the degree and depth of understanding and interest in environmental information. This study investigates the relationships between the societal and demographic backgrounds of residents (e.g. gender, age, migration and educational background) and their engagement with environmental information.

7.1. Introduction

This study aims to find out a possible solution to minimise the inequality among stakeholders which can be an important barrier in environmental public participation by investigating how individual stakeholders' backgrounds influence the level of stakeholders' engagement with environmental public participation for decision-making process. Environmental problems from industrial development are typically complex and dynamic, which require close collaborations between the industry and stakeholders to address these problems (Lawrence, 2006; Prell et al., 2007; Stringer et al., 2007). Accordingly, the importance of public participation in environmental decision-making has been increasingly recognised by academic researchers and policy makers since the Brundtland report in 1987 (Reed, 2008; Stringer et al., 2007). The Brundtland report suggested public participation for a commitment to equity, fairness and justice in environmental decision-making (Prell et al., 2007; Syme, 2012; WCED, 1987). The necessity of public participation for the environmental decision-making process was emphasised again in the Agenda 21 report in 1992 (Spangenberg et al., 2002; UNCED, 1992). Public participation has been increasingly used as a democratic process in environmental decision-making after the Aarhus convention in 1998 (Moran et al., 2008; Reed, 2008; UNECE, 1998). Since then, public participation has been recognised as the norm in sustainable development to engage and educate stakeholders in natural resource management (Hartley & Wood, 2005).

Successful public participation can enhance the effectiveness of the environmental decision-making and impact assessment process (Lawrence, 2003; Reed, 2008). There has been an increase in awareness of local environmental problems which encourages local interest in environmental planning and decision-making (Mannarini & Talò, 2012; Tippett et al., 2007). It is possible to enhance stakeholder engagement by taking local interests and concerns into account (Dougill et al., 2006; Reed, 2008). The increased stakeholders' interest can result in a long-term benefit which can sustain local environmental and economic development (Tippett et al., 2007). However, the different backgrounds of stakeholders can represent inequalities between groups, which can be an important barrier to effective engagement (Reed, 2008). There are many difficulties in engaging stakeholders in the environmental information and decision-making process (Prell et al., 2007; Tippett et al., 2007). For instance, a difference in educational backgrounds may be the cause of different levels of understanding of environmental information in a community (Moran et al., 2008; Prell et al., 2007). Local people may have more interest in participating in environmental decision-making than migrants (Tippett et al., 2007). Stakeholder analysis has gained attention in responding to the challenge of inequalities within groups of stakeholders (Dougill et al., 2006; Prell et al., 2007; Reed, 2008; Tippett et al., 2007). Stakeholder analysis is a process to identify and prioritise individuals and groups of stakeholders for involvement in public participation (Prell et al., 2007; Reed, 2008). It can help to provide a better understanding of stakeholders and suggest a suitable technique to communicate with them (Reed, 2008).

In this study, the levels of stakeholders' engagement with environmental information are compared by an independent samples t-test. The questionnaire survey in this thesis complies with all assumptions of hypothesis testing. Participants were invited randomly and their responses are independent. The variables were measured and calculated on a scale of 1 – 9. The distribution of scale variables was checked before performing a t-test. The study tests the hypothesis that stakeholders' backgrounds influence the degree of interest and understanding of environmental information. Further investigation into the influences of stakeholders' backgrounds (e.g. migration, education, gender and age) was investigated by a correlation analysis.

Migration background: The study aims to examine the differences in the degree of interest in environmental information in public participation between local residents and migrant populations.

Educational background: The study intends to compare the degree of understanding of environmental information between residents from a group with only high school education or lower and another with higher education. In the study, the participants who finished at school level (primary, secondary and high school) were grouped in high school level or lower. Another, higher education group consisted of participants who graduated at certificate/diploma, undergraduate and postgraduate level.

Gender: The study investigates whether there is any difference in the degree of understanding and interest in environmental information between male and female.

Age: The study examines whether there is any difference in the degree of understanding and interest in environmental information among two groups of residents with different ages. The standard retirement age in Thailand is 60; therefore, the study compares between senior citizens, whose ages are over 60, and non-senior citizens.

7.2. Analysis of quantitative results

This section presents the results of the data analysis from the questionnaire survey to investigate the MTP residents' engagement with environmental information by the use of quantitative methods, independent sample t-test and regression analysis.

7.2.1. Quantifying degree of interest in environmental information

195 of the total 395 participants, who have lived in MTP for durations shorter than their age, were classified as migrant populations. The other 200 participants were native-born to MTP (Table 7-1).

Table 7-1: Demographic information and statistics by migration background

Demographic information		Local populations	Migrant populations
Gender	Male	107 (27.1%)	131 (33.2%)
	Female	93 (23.5%)	64 (16.2%)
	Total	200 (50.6%)	195 (49.4%)
Education level	Primary School	68 (17.2%)	41 (10.4%)
	Secondary School	43 (10.9%)	51 (12.9%)
	High School	36 (9.1%)	45 (11.4%)
	Certificate / Diploma	32 (8.1%)	35 (8.9%)
	Undergraduate	18 (4.6%)	17 (4.3%)
	Postgraduate	3 (0.8%)	6 (1.5%)
	Total	200 (50.6%)	195 (49.4%)

This section attempts to quantify the degree of interest in environmental information by collecting the participants' perceptions across the Likert scale which is commonly used in social science research (Hesse-Biber & Leavy, 2010; Silverman, 2011). A higher degree of interest means that the participants have more interest in environmental information.

Table 7-2: The results of normality test and t-test on the degree of interest

Interest	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
Local	200	5.2331	1.68573	.986	200	.052
Migrant	195	5.2012	1.74367	.986	195	.051
Independent Samples Test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances	F		Sig.	t	df	Sig.
not assumed	3.985		.047	20.987	382.165	.000

The results (Table 7-2) indicate that the null hypothesis, normal distribution data is accepted ($p>0.05$) and show a statistical difference of perception between the two groups. ($t=20.987$, $df=382.165$, $p < 0.05$).

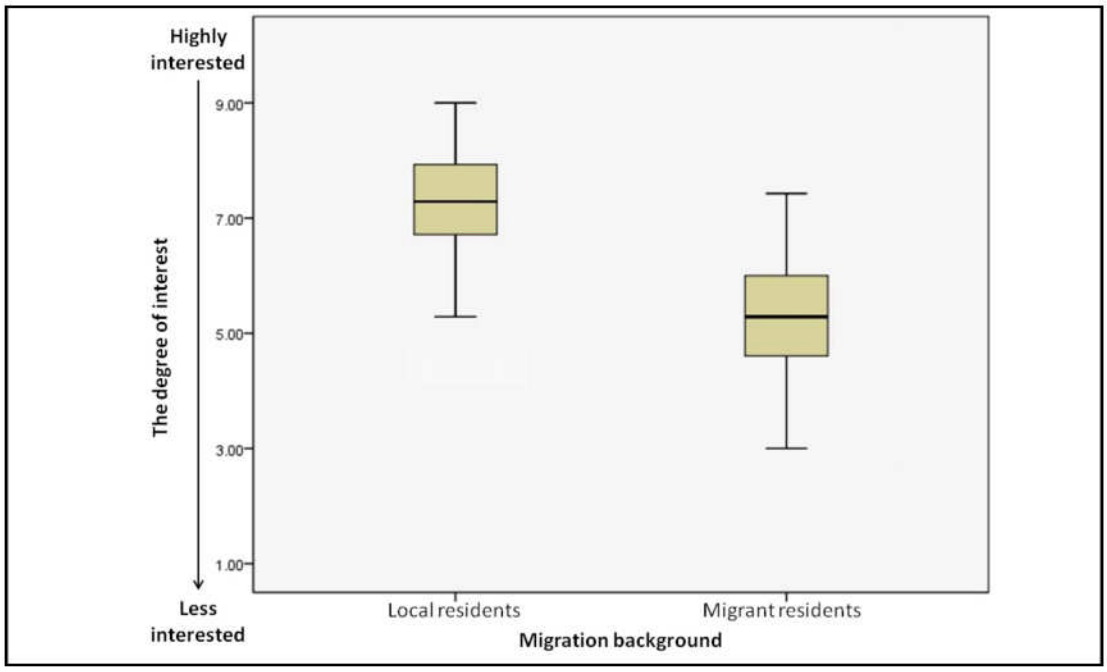

Figure 7-1: T-test result showing a comparison of the degree of interest between local residents and migrant populations.

The t-test result shows that local residents have more interest in environmental information than migrant populations (Figure 7-1). This study also investigated the influences of other stakeholders' backgrounds such as gender, education and age by a regression approach.

Table 7-3: Model summary presenting the relationship between the degree of interest and migration backgrounds.

Model		R	R Square	Adjusted R Square	Standardised Coefficients	t	Sig.
1	(Constant)	.718	.515	.514	5.326	77.904	.000
	Migration				.718	20.424	.000
2	(Constant)	.735	.540	.538	4.986	50.353	.000
	Migration				.712	20.769	.000
	Education				.159	4.634	.000
3	(Constant)	.744	.554	.550	4.989	51.073	.000
	Migration				.710	21.002	.000
	Education				.135	3.910	.000
	Age				.119	3.455	.001
Excluded							
1	Gender						

Note:					
	Migration	(Mig) : local	=1	and migrant	=0
	Education	(Edu) : high school or lower	=1	and higher education	=0
	Gender	(Gen) : male	=1	and female	=0
	Age	(Age) : senior citizen	=1	and non-senior citizen	=0

The results (Table 7-3) show the degree of interest in environmental information is reflected in the stakeholders' migration, education and age. The correlation between the degree of interest and stakeholders' backgrounds is explained by the following equation.

$$The\ degree\ of\ interest = 4.989 + 0.710(Mig) - 0.135(Edu) - 0.119(Sr)$$

The migration background is a major influential factor (0.710) on the degree of interest. The education (-0.135) and age (-0.119) also influence the degree of interest. The equation quantifies the degree to which local residents show more interest in environmental information. Residents within high school or lower education and senior citizens have less interest in environmental information than the higher education groups and non-senior residents. The model has a degree of accuracy at 55% (adjusted R^2 is 0.550).

7.2.2. Quantifying degree of understanding of environmental information

284 of the total 395 participants, who finished at school level, were in the high school or lower group. The numbers of participants who finished primary school, secondary school and high school were 109, 94 and 81 respectively. The other 111 participants were within the higher education group. The numbers of participants who graduated from certificate/diploma, undergraduate and postgraduate level were 67, 35 and nine respectively (Table 7-4).

Table 7-4: Demographic information and statistics by educational level

	Educational level						Total
	High school or lower			Higher education			
Gender	Primary School	Secondary School	High School	Certificate / Diploma	Undergraduate	Postgraduate	
Male	64	56	51	40	21	6	238
	16.2%	14.2%	12.9%	10.1%	5.3%	1.5%	60.3%
Female	45	38	30	27	14	3	157
	11.4%	9.6%	7.6%	6.8%	3.5%	0.8%	39.7%
Migrant data	Primary School	Secondary School	High School	Certificate / Diploma	Undergraduate	Postgraduate	Total
Local	68	43	36	32	18	3	200
	17.2%	10.9%	9.1%	8.1%	4.6%	0.8%	50.6%
Migrant	41	51	45	35	17	6	195
	10.4%	12.9%	11.4%	8.9%	4.3%	1.5%	49.4%
Total	109	94	81	67	35	9	
	27.6%	23.8%	20.5%	17.0%	8.9%	2.3%	395
			284			111	100.0%
			71.9%			28.1%	

The section aims to compare whether the degree of understanding of the two broad educational backgrounds are statistically different from each other. A higher value of the degree of understanding means that participants have more understanding of the environmental information.

Table 7-5: The results of normality test and t-test on the degree of understanding

Understanding	Group Statistics			Test of Normality (Shapiro-Wilk)		
	N	Mean	Std. Deviation	Statistic	df	Sig.
High school or lower	284	4.6041	1.44591	.990	284	.056
Higher education	111	7.3436	1.00590	.978	111	.065
Independent Samples Test	Levene' Test for Equality of Variances			t-test for Equality of Means		
Equal variances	F		Sig.	t	df	Sig.
not assumed	16.900		.000	-21.342	286.722	.000

The results (Table 7-5) indicate that the null hypothesis, normal distribution data is accepted ($p>0.05$) and show a statistical difference of perception between the higher education and high school or lower groups. ($t=-21.342$, $df=286.722$, $p < 0.05$).

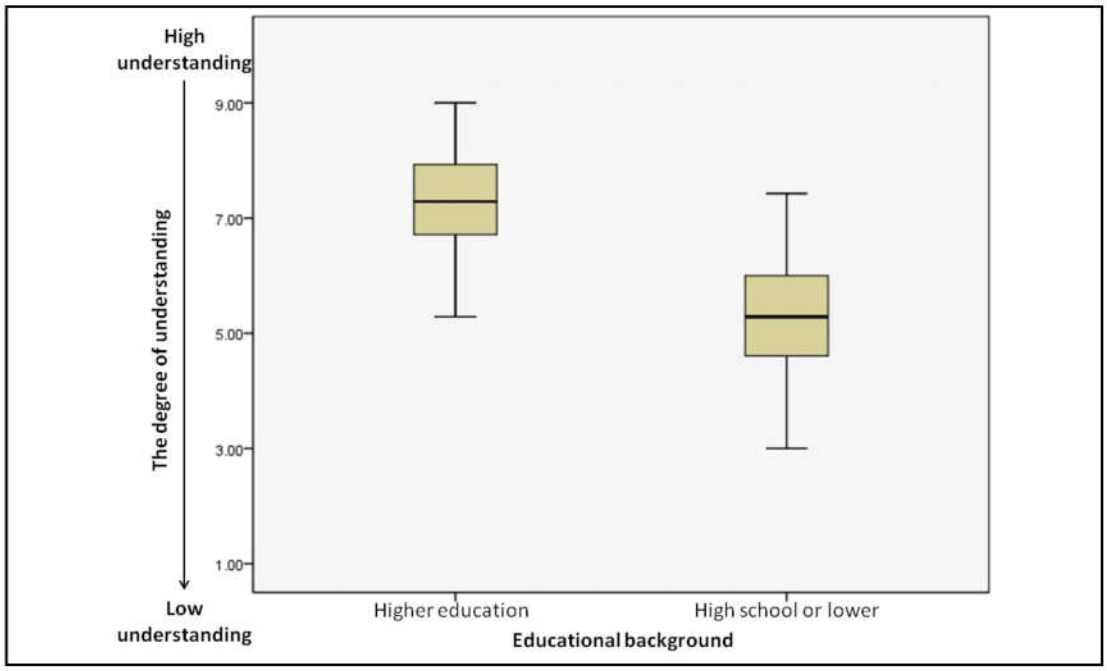

Figure 7-2: T-test result showing a comparison of the degree of understanding between higher education and high school or lower group.

The comparison in Figure 7-2 shows that participants within the higher education group have greater understanding of environmental information than participants from the high school or lower group. The correlation analysis was used to investigate the influences of other stakeholders' backgrounds; gender, migrant background and age.

Table 7-6: Model summary presenting the relationship between the degree of understanding and educational backgrounds

Model		R	R Square	Adjusted R Square	Standardised Coefficients	t	Sig.
1	(Constant)	.678	.460	.459	7.344	57.850	.000
	Education				-.678	-18.299	.000
2	(Constant)	.698	.487	.484	7.344	59.258	.000
	Education				-.645	-17.455	.000
	Age				-.167	-4.513	.000
Excluded							
1	Migration						
2	Gender						

Note:					
	Migration	(Mig) : local	=1	and migrant	=0
	Education	(Edu) : high school or lower	=1	and higher education	=0
	Gender	(Gen) : male	=1	and female	=0
	Age	(Age) : senior citizen	=1	and non-senior citizen	=0

The results (Table 7-3) show the degree of understanding of environmental information depends on stakeholders' backgrounds; education is the major influential factor (-0.645), age also has a minor influence (-0.167). The correlation between the understanding of environmental information and stakeholders' backgrounds is explained by the following equation.

$$The\ degree\ of\ understanding = 7.344 - 0.645(Edu) - 0.167(Sr)$$

The equation quantifies the degree to which the residents who had higher education have a better understanding of environmental information than a group of high school or lower education residents. The senior citizens have less understanding of environmental information than non-senior residents. The model explains 48.4% of the observed questionnaire data.

7.3. Analysis of qualitative results

This section presents the results of focus group discussions which help to support the quantitative results from earlier section. 24 MTP residents from different migration and educational backgrounds were invited to participate in four focus groups that lasted about 30 minutes. The focus group participants were randomly selected from the 395 participants in the questionnaire survey. The participants may not be representative of the general population; however, the purpose of these focus groups is to investigate sophisticated issues from a cross-section of the MTP residents. The participants were asked to share their experiences of environmental public participation processes to explore stakeholders' engagement with the environmental information in EMS and the decision-making process in MTP. They were asked questions about their interests and understanding of the environmental information.

7.3.1. Accessing residents' interest in environmental information

The MTP residents from different migration backgrounds were invited to participate in two focus group sessions. Six participants, who were born in MTP, were invited to represent a group of local residents. Six migrant residents were invited to provide a

view of migrant populations in MTP. The discussions lasted about 30 minutes, were guided by a semi-structured interview schedule consisting of three parts:

- Participants' past experiences in MTP (MTP before industrial development or the reasons for moving into MTP)
- Participants' interest in environmental information
- Suggestions to improve the public participation process

In the first part of the focus group discussions, participants were asked about their past experiences in MTP. The group of local residents talked about MTP before industrial development when they made their living by agriculture and fishery. The locals felt that the environmental conditions were better than now and were concerned over the environmental and health impacts from the industrial development. However, some participants were satisfied with the infrastructural developments which were brought to the area by the industry; for example, the improved living conditions are due to the significant improvement in the electricity and water supply.

"Since I was born, the common occupations of people around here [MTP] were growing tapioca and doing some small fishing. The environment was better then. We don't know what chemicals these factories are emitting now. We used to live in a natural environment. When I was a young child of 13, there was no electricity, and it was not very convenient". (Male participant, local resident group)

"During my childhood days, there was nothing around here but tapioca plantations. In those days, we lived in a subsistence manner. But our lives are better now. The industrial development has changed MTP in many ways. The [MTP] economy is better than before, but the environment is terrible". (Female participant, local resident group)

"In those days, fishing was very good, and growing tapioca was also very good. We grew our hundreds of rais [Thai unit of area, one rai equates 1,600 square metres]. Mango fruits were also very prolific". (Female participant, local resident group)

"My father used to grow tapioca for wages. There was no pollution then, but life was difficult. It can't be compared with that of the present time. It is more civilised now. The utilities, electricity and water supply, are better than before". (Male participant, local resident group)

"It is good as long as we don't have to deal with the hazardous substances. We fear hazardous substances". (Female participant, local resident group)

"In the old days when we did farming, there was no such thing as cancer. These days when we go for medical examinations, the doctor diagnoses cancer. My elder sister also died of cancer. It is terrible". (Male participant, local resident group)

The migrant residents told their stories about when and why they moved to MTP. Although they knew that MTP is regarded as one of the most polluted areas in Thailand, their main reason to move into the MTP was job related. Some participants moved from Bangkok, the capital, which is known to be the most polluted city in Thailand. They think that there is no difference in the quality of the environment between Bangkok and MTP. They gave a further explanation about their reasons to settle down in MTP because they can find a job here more easily than in other built-up areas, including Bangkok.

"I am originally from Bangkok. I moved here to work as an engineer 15 years ago. I can't see any difference in terms of environmental conditions between here [MTP] and Bangkok. It is absolutely fine for me to live here". (Male participant, migrant resident group)

"I moved here along with my husband who came to work for a petrochemical company nine years ago. We moved from Bangkok, but we were born in the north of Thailand. MTP has relatively more problems, but the economics here is much better". (Female participant, migrant resident group)

"I moved into MTP for a job as a back hoe driver about 18 years ago, therefore I've registered as a MTP resident since then. I moved from the north of Thailand. Yes, my province is better in terms of environment and weather, but I had to move here to work". (Male participant, migrant resident group)

"My husband moved into MTP to work for a construction company. I moved along with my husband from Bangkok. We were born in the north of Thailand. Truly speaking, we moved here from Bangkok which is equally polluted, but he can make more money here". (Female participant, migrant resident group)

"I have worked here for 12 years as a civil engineer. I moved from Bangkok, but I am originally from a province in the north of Thailand. It is easier to make money here in MTP than in other places". (Male participant, migrant resident group)

"I moved from Bangkok but was born in the north east of Thailand. I moved for a job as a mechanical engineer 20 years ago. I think MTP, Bangkok or any other industrial areas have the same level of pollution. The MTP economy is good, money is easy to make". (Male participant, Migrant resident group)

Because the first part of the discussion was a familiar topic to participants, it created a friendly atmosphere. Then, the discussion moved to a topic about the environmental information in the EMS and the decision-making process in MTP. Participants were asked about their interest in the information. In the group of local residents, participants showed their interest in environmental information. They wanted information about many aspects of the environment, for example, how to cope with hazardous chemicals and emergency response operations. They also preferred to have face-to-face communication for updating and exchanging environmental information with the industrial sector.

"Really, the more often the better, so there can be mutual understanding. It is not a bother or waste of time for work. At least if we have anything in mind, we can talk about it. We want to know detailed information about the activities of PTT in every aspect, as regarding the environment. [PTT] should sound out opinions in the community and get to know what we want at least once a month. It is not good to do this with printed materials". (Male participant, local resident group)

"Go ahead and send information about the environment as often as you want. It is not a bother". (Female participant, local resident group)

"I am happy to have been invited [by the industrial sector] for meals together, so we can talk. [The meeting] Once a month meeting is better than communicating with us by printed materials". (Male participant, local resident group)

"We have to meet face-to-face anyway to discuss matters on hand for better understanding". (Female participant, local resident group)

"We want to have the environmental data concerning dangerous chemical substance in the factory". (Female participant, local resident group)

"We want information about the environment and how to cope with emergencies. I would like to see that the information is sent out to everyone [in the community], not just the community leaders". (Male participant, local resident group)

"Sometime a flare bursts out flames as if there is a fire, especially at night. It was about almost midnight. The community residents were scared lest something bad happens. When calling the industrial estate for information, the [industrial estate] officers had no response. We want to be informed of this type of situation. We don't want to wait until emergency strikes. It is important to make the community understand what is happening". (Male participant, local resident group)

While the local residents were interested in environmental information, the participants who represented a group of migrants showed less interest in face-to-face communication, but preferred to have a big gathering in order to not affect their time.

"Frankly speaking, the community leader has a problem in his hand. The factories don't distribute participatory fees by themselves, but let the community leader do the job. For example, a sum of 2,000 THB is for 10 participants. About 200 THB looks decent to community residents to compensate for their time, but some people just don't show up. Usually, it takes all the day for a participation process. It'd be good, if it lasts for only half a day. Then, it wouldn't affect our time much. It's fair to get that 200 THB to compensate for our time. In my opinion, it would be good to have a big gathering of about 500 people". (Male participant, migrant resident group)

"It would be good to have a bigger gathering. Participants have their own opinions. Some are too shy to speak out or reveal their viewpoints. We get to consider the issues that we have never known before. We learn things when we go. Some speak for their own benefit to boost up their ego. Some speak for popularity sake when provoked by the crowd. There would be all kinds of voices. We can discern this type of behaviour. However, we don't need the whole day to do this. A group of 400 – 500 people to meet for half a day is good enough". (Female participant, migrant resident group)

"In a big gathering about 500 people, I think only less than 10% of the audience are attentively listening. It all depends on the speaker and whether we are keen on listening. It would be like academic speaking. It can be difficult and too much to remember. Only if the speaker is artful and able to deliver an interesting speech, then the audience won't doze off". (Male participant, migrant resident group)

When the discussion in the group of migrants moved on to the topic of what information might be of interest to them, the participants said that they are not concerned about emergency management or interested in material safety data of hazardous substances.

"I am not concerned about emergencies or accidents [in MTP], and I can see that it doesn't happen often. Instead, the industry should be focus more on the safety of lives and properties in keeping with growing crime and traffic because of the growing number of people. As for the crime problems, there must be co-operations among the industrial organisations in the area". (Male participant, migrant resident group)

"I trust the big companies more than I do the small ones. The problems tends to take place more often in small companies, because big companies mix in with the community but small ones never get in touch with the community. I don't trust them for this fact. They [small companies] don't hold themselves accountable for anything. When there is an incident, a medical attention must be given and there

must be responsible party. Sometimes the community knows there is problem, but some companies don't admit it". (Male participant, migrant resident group)

"The information about hazardous substances is difficult to comprehend. This is my own opinion. We just don't understand it. We also aren't interested in it". (Female participant, migrant resident group)

The participants who represented a group of local residents showed their interest in various aspects of environmental information such as material safety information for hazardous substances and emergency responses. In terms of frequency of communications about the environmental information, the local residents said that it did not bother them; they not only wanted to get the information but also preferred to have a face-to-face meeting with the industrial sector at least once a month to discuss environmental issues. In contrast, the migrant residents in MTP have less interest in participating with the industrial sector. The migrants are not worried about emergency management or interested in hazardous substance in the MTP.

7.3.2. Accessing residents' understanding of environmental information

The participants were grouped based on their educational backgrounds; six participants represented a group of MTP residents who graduated at higher education level (certificate/diploma, undergraduate and postgraduate), and another six participants who were from school level (primary, secondary and high school) represented the high school or lower group. The participants were asked to share their opinions about the environmental information that was provided in the EMS and the decision-making process in MTP. The discussions, which lasted about 30 minutes, were guided by a semi-structured interview schedule consisting of three parts:

- Participants' experiences in public participation in MTP.
- Participants' understanding of environmental information.
- Suggestions to improve the public participation process.

All participants in the high school or lower group felt that the information was too technical and difficult to understand, stressing that it is too theoretical. This information was not interesting and made residents feel bored. They said that there

were only a small number of participants who can understand and have interest in technical information. Most of MTP residents, especially older generations, finished only secondary school or lower and do not understand this information.

"In the public participation sessions, the industrial sector presented information by means of technical presentations which are difficult to understand". (Female participant, high school or lower group)

"We would like to see the real immediate action without too much reference to a bunch of technical backgrounds. It is too technical for us. Showing us a real action is better than talking". (Male participant, high school or lower group)

"Sometimes environmental information is too technical and not actually relating to the residents. There is no need for too much technical literature stuff. It isn't interesting". (Male participant, high school or lower group)

"If it is the factories aim to educate the residents in MTP, the effort will get nowhere. They won't understand, worse yet, it will only give them more headaches. Although, there are some highly educated people, they already have knowledge and aren't interested". (Female participant, high school or lower group)

"There is a big gap between the residents' ability to comprehend and the level of technology. The factory presents all data and provides mitigation measures but these measures are technical information. We don't understand what it means. We want to learn more practical measures. Showing us a real action is better. The [MTP] residents, particularly older ones, only finished primary or secondary school respectively by their age". (Male participant, high school or lower group)

"In the public participation sessions, only 10% of the participants are active and interested, the rest just show up. They don't understand what it's all about. It is incorrect to measure the public participation by the number of participants, not how well they understand. Only the young ones, who got higher education, can understand the process. Older generations who only completed primary or secondary school cannot get it". (Female participant, high school or lower group)

The participants pointed out the problems with organising public participation in MTP. They thought that the objective was set incorrectly on the number of participants instead of on the quality of the information that is exchanged. They also suggested that a good relationship between a factory and the community is important and helpful for implementing the public participation process.

"Some factories, when they talk about the level of participation, they only consider head counts without mentioning the quality of participation. After such participation, when these factories have a problem with the community, there are so many things

that could go wrong. On the other hand, if a factory maintains a good relationship with the community, it can be very helpful when the factory has problems". (Male participant, high school or lower group)

"In my opinion, a good and consistent relationship between a factory and the community is more important than holding a staged participation for just one day. There are only a small number of people interested in actual participation". (Female participant, high school or lower group)

"When people on two sides are angry with each other, whatever information from one side will be disregarded by the other, but when they like each other, any information will make good sense. There are factories which do a good job in the [public participation] process but exclude community involvement. One day, they will have problems [with the community]". (Male participant, high school or lower group)

In the session of the higher education group, the participants were satisfied about the public participation process in MTP. They felt that environmental information is not too difficult to understand. The participants also thought that the level of education has an influence on the ability of residents to understand the environmental information. They explained that MTP residents may find it difficult to understand the information because of their limited education, particularly senior residents.

"In my view, the format of the public participation sessions [in MTP] looks alright considering it a part that fits in with the group of residents in that particular community. The information received from the company is pretty clear in the sense that what they intend to do and what impact we can expect. During the [EIA] study period, the company have done a good job". (Male participant, higher education group)

"As for me personally, I don't have any problem, but when relating to the residents as in asking whether they understand some indicating index. For example, BOD most of the residents about 90% don't know or don't understand. They only see a company in terms of relationship with the community. When they participate, they expect for something else. It has to do with the understanding of information. Limited formal education is a part of the drawbacks. Most of MTP residents only have high school or lower education". (Female participant, higher education group)

"I think education plays a role in the way one gives information and the ability to comprehend information. Sometimes the terms used such as the question about emission standard of BOD are too technical. Not all residents can understand due to the difference in their educational levels. Most of the [MTP] residents, particularly senior citizens, finished only primary or secondary school. Sometimes they participate for money or remuneration". (Male participant, higher education group)

The participants were then asked about how to improve the understanding of environmental information for residents in MTP. They suggested that background knowledge and technical terms should be given in brief explanations to the residents before the public participation process. They also identified the problem of the reliability of the information; they requested more consistent and up-to-date information. They suggested that the industry should bring up information about the trends of the pollutant concentrations in MTP. For example, the residents wanted to know whether or not they are safe from heavy metal contaminations, if they eat fish from the sea in MTP, and what are the levels of heavy metal contamination that it considers safe for us.

"If brief explanation can be given on some technical terms such as what BOD represents, it will be helpful. It can come in a form of document or something that provides the residents with these kinds of information, but it should not be in huge stacks. Just a few sheets would suffice". (Male participant, higher education group)

"Public participation is a process required by the regulation. The industry must establish an understanding as to which pollutant is excessive, as in air pollution or wastewater". (Female participant, higher education group)

"The information should bring up the subject relating to the tendency that pollutants are on the increase. For example, the impact on the sea in MTP should be a point of discussion. If we eat fish [from the sea in MTP], will we get any heavy metal"? (Female participant, higher education group)

"It's a problem with the basis of information. The information that we want is an up-to-date one which really impacts the community, for instance, information about water and air quality. I would like to see clear-cut and up-to-date information instead of relying on the old and obsolete one, so we can inform the residents of what needs be corrected. In the case of heavy metal, the past examination pointed to mercury, zinc and lead. We would like to see that this information are studied and gathered for the residents as they are important". (Male participant, higher education group)

The participants highlighted an interesting observation that the residents' comprehensibility of the information relates to the degree of interest in public participation.

"The ability to understand the information depends on the level of education. Sometimes the information is so overwhelming and too technical. Thereby, it becomes uninteresting and time wasting". (Male participant, higher education group)

"The level of education affects the interest to participate. The residents [in MTP] have different levels of education. The problem is that the residents don't want to participate, but do for expense reward. So when problems arise, they scream in denial for having been given knowledge of environmental information". (Female participant, higher education group)

"I have learned from studying how the emission standards should be, how they impact the environment. It may hard to get them through to people at large. Sometimes residents are recruited to join in merely to show big head counts, but they don't understand the information". (Female participant, higher education group)

All participants in the group of high school or lower said that the environmental information is too difficult for them; they felt that technical information is boring. On the other hand, in the higher education group, participants thought that the information is not difficult for them. They showed their interest in information about environmental impacts and the trends of pollutions in MTP. Moreover, the participants in both groups pointed out the problem of different educational levels in the area; they explained that most of MTP residents finished only high school or lower, particularly older generations. Only a small number, mainly from the young generations, have graduated from higher education. They also indicated that the ability to comprehend information depends on the levels of education and affects the degree of interest in public participation.

7.4. Mixed methods analysis

7.4.1. The influence of age and stakeholder engagement

The quantitative analysis established that the age of stakeholders has an influence over the degree of stakeholder engagement. The regression models explained that senior citizens have less interest and understanding than non-senior citizens. Age has effects on stakeholder engagement similar to education but is less influential. The study of demographic information provides a deeper understanding of the relationship between senior citizens and their education.

Table 7-7: The demographic information of senior and non-senior citizens organised by education

Education	Non-Senior	Senior	Total
Primary school	78	31	109
Secondary school	88	6	94
High school	81	-	81
High school or lower	247	37	284
Certificate / Diploma	67	-	67
Undergraduate university	35	-	35
Postgraduate university	9	-	9
Higher education	111	-	111
Total	358	37	395

The results (Table 7-7) show that age is a potential confounding variable of the correlation between education (independent variable) and stakeholder engagement (dependent variable). A confounder is a variable that correlates with both the independent variable and the dependent variable. This finding is supported by the qualitative data that highlighted differences in education levels among residents from different generations. The senior citizens in MTP finished only primary or secondary school, while a number of the younger generations graduated from higher education.

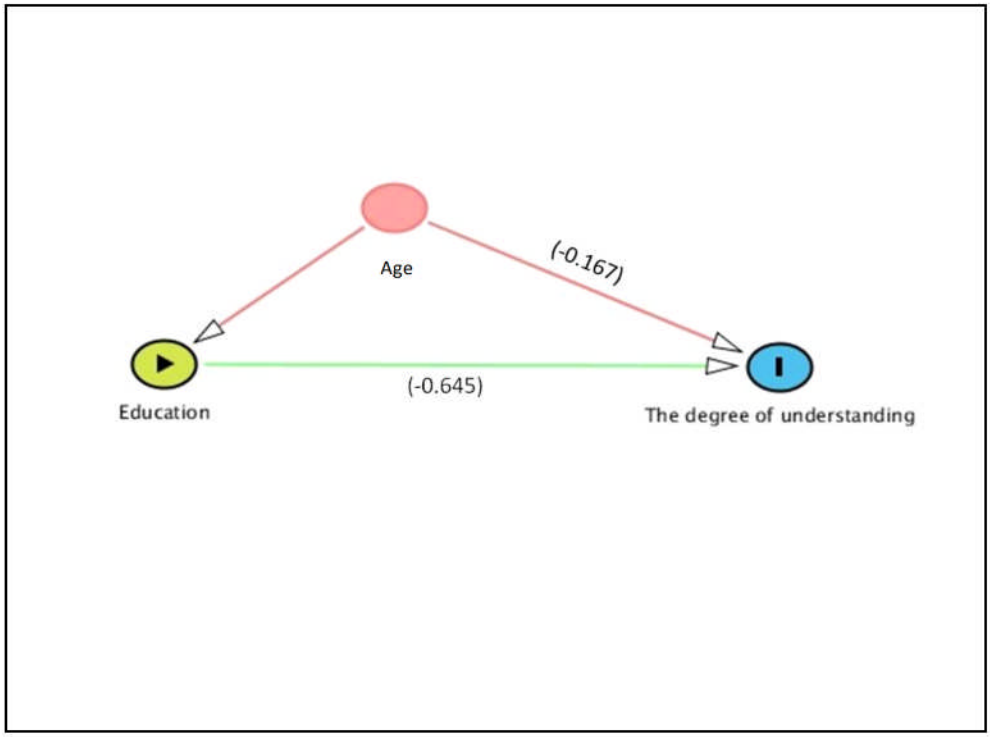

Figure 7-3: Diagram showing the relationship between stakeholder backgrounds and the degree of understanding. Age of stakeholders correlates with both an independent variable (Education) and a dependent variable (The degree of understanding)

The age of residents acts as a confounder (Figure 7-3). As an independent variable, education produces greater understanding. According to the analysis of qualitative results, most of the senior citizens in MTP finished their education at high school or lower; these elderly residents often have difficulty with accessing environmental information.

7.4.2. The influence of stakeholder backgrounds on the degree of understanding

The quantitative analysis showed that the group of higher educated residents had more understanding of information than the group of residents who had high school or lower education. The study further investigated how other stakeholder backgrounds (gender, migration and age) influence the degree of understanding. The model which explains 48.4% of the observed data predicted that education is a main factor (0.645). The regression model also revealed that age has an effect on the stakeholders' understanding (0.167) with younger residents having more comprehension than senior citizens. The analysis showed that age is a confounding variable of the correlation between education (independent variable) and the degree of understanding (dependent variable). Therefore, the quantitative results concluded that education is a major influential factor on stakeholders' understanding of environmental information. The model interpretation is consistent with the qualitative result; residents with high school or lower education found it difficult to understand environmental information in public participation, while residents who graduated higher education felt comfortable to participate in the process.

The results concluded that the level of comprehension related to the stakeholders' education. From the demographic information, the majority of participants (71.9%) finished high school or lower while only one-third of participants (28.1%) graduated higher education. The information is consistent with the results of focus groups which suggested that most of the MTP residents had high school or lower education and there were small numbers of young residents who had higher education. The findings suggest that a highly heterogeneous group of residents with a wide range of educational backgrounds could be one of major challenges in public participation.

7.4.3. The influence of stakeholder backgrounds on the degree of interest

The study revealed that migration background has an influence over a stakeholders' interest. The quantitative analysis showed that local residents have more interest in environmental information than the migrant residents. The study further investigated how other stakeholder backgrounds, such as gender, education and age, influence the degree of interest. The regression model predicted, at accuracy of 55%, that the migration background (0.710) played a main factor; local residents showed more interest in public participation than migrant residents. Moreover, residents in higher education groups (0.135) and younger residents (0.119) have more interest than residents who had high school or lower and senior citizens. The study found that age has an effect on the degree of interest as a confounder; it correlates with the degree of interest the same as education does.

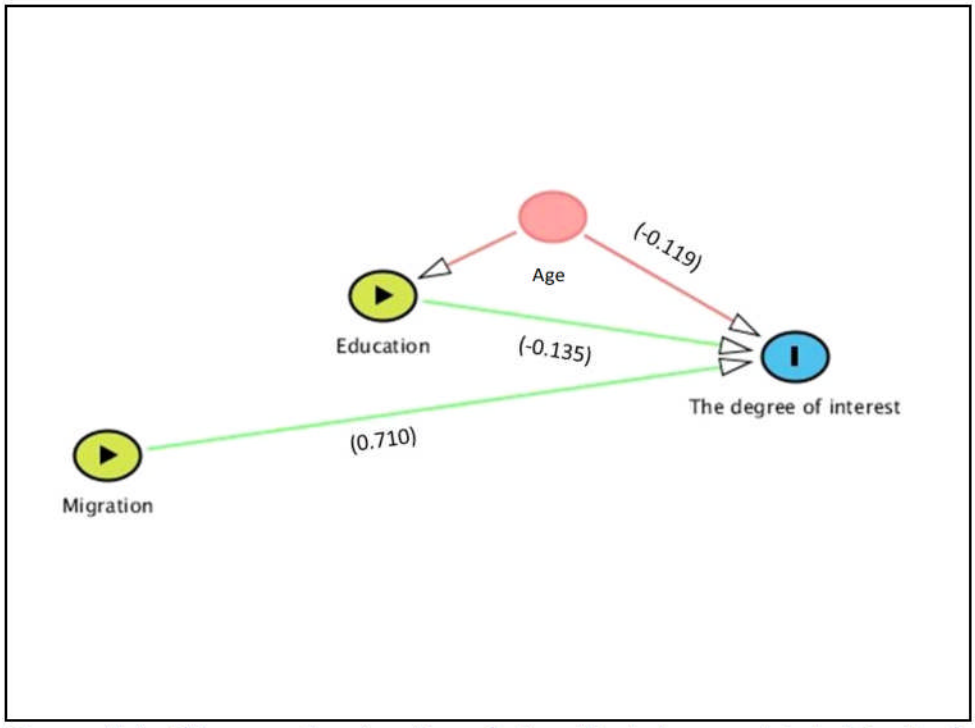

Figure 7-4: Diagram showing the relationship between stakeholder backgrounds and the degree of interest. Migration and Education are independent variables, while Age is a confounder.

The migration background is the most influential factor for the degree of interest (Figure 7-4). As discussed above, the ability to comprehend is related to the degree of interest; therefore, age and education influence not only the degree of understanding but also the degree of interest. The interpretation of the diagram above

is that migrant residents show less interest than local residents. Furthermore, residents in high school or lower education and senior citizens also have less interest in public participation. As a confounder, elderly residents have only secondary school or lower education; they feel the public participation is too difficult for them and feel bored with the participatory process. The study suggested that education is an important factor in designing of the public participation process because education influences not only the degree of understanding but also the degree of interest.

These findings were supported by the focus group discussions: local residents were interested in getting involved with environmental public participation because they felt that the quality of the environment in MTP has changed since industrial development in the area. Their main concern was that industrial emissions cause an impact upon the health of the MTP residents. They also wanted to express their concerns and get updated environmental information from the industrial sector in face-to-face communication. Local residents showed their interest in receiving environmental information and having open communication with the industry, while migrant residents have less interest in the information or participating in the process. It could be possible that migrant residents had already acknowledged the environmental conditions in MTP before they decided to settle down in the area. Migrant residents, some moving from other polluted areas such as Bangkok, could not see any difference in terms of environmental qualities. Some of them had moved into the area because of an economic reason and recognised MTP as a great opportunity to find a job. Moreover, the qualitative results suggest that the ability to comprehend information has an effect on the degree of interest; residents who finished high school or lower feel that the environmental information is too difficult and makes them bored.

7.5. Discussion

This study was designed to determine the relationships between stakeholders' backgrounds and their engagement with environmental information. The study established that education is the most influential factor, which has effects not only on the degree of understanding but also on the degree of interest in the information. Age

is a confounding variable in the relationship between education and stakeholder engagement. Migration background has an effect on the degree of interest in the information. The study also found that gender has no effect on the stakeholder engagement with public participation.

7.5.1. Stakeholder analysis and public participation

This study concluded that stakeholder analysis can enhance the effectiveness of public participation because it provides essential information to design a suitable public participation process. To cope with a heterogeneous group of stakeholders, a number of studies suggested that stakeholder analysis could provide essential information for public participation (Reed, 2008). Stakeholder analysis can improve the effectiveness of public participation by providing a better understanding of the heterogeneity of stakeholder educational levels in an area (Prell et al., 2007; Reed, 2008). The results of stakeholder analysis could help an industrial organisation provide suitable environmental information for its stakeholders (Reed et al., 2009; Tippett et al., 2007). Stakeholder analysis can provide an understanding of stakeholder backgrounds that affect the degree of interest. It would be helpful for an industrial organisation to provide an interesting from of information that is accessible to all educational levels, and design a persuasive technique for implementing a participatory process. This would provide an increasing degree of interest in environmental information among the stakeholders. The increase of stakeholders' interest in environmental information could enhance the success of the environmental public participation. Successful public participation is a long-term benefit that brings sustainable environmental and economic development (Tippett et al., 2007). A successful participatory process can bring a good relationship and trust between residents and the industry.

7.5.2. Education for sustainable development and public participation

The results of the study showed that education is a major influential factor on stakeholder engagement with public participation when compared to other stakeholders' demographic backgrounds such as gender, age and migration. A considerable number of studies suggest the importance of education for sustainable development (ESD) in public participation. Education is highlighted by the United

Nations Educational, Scientific and Cultural Organisation (UNESCO) as a main instrument to encourage stakeholders, particularly younger generations, to address the social determinants of environmental problems (Schnack, 2008; Schusler et al., 2009; UNESCO, 2005). The educational background is important in public participation because a good educational background makes it possible for stakeholders to access and understand environmental problems comprehensively (Breiting, 2009). It could be possible that industry fails to engage stakeholders with environmental public participation because the educational programme both in and out of school does not prepare the stakeholders enough for political action and they are familiar with the conventional top-down process (Lundholm & Plummer, 2010). A number of studies in Thailand point out that the top-down policy which is normally found in developing countries, including Thailand, could be one of barriers in public participation process (Bowornwathana, 2006; Kelly et al., 2012; Missingham, 2000). The top-down approach usually discourages the local community to access environmental information and participate in decision-making process; as a result, the top-down approach has led to a lack of confidence within the local community to participate in the environmental solving and decision-making process (Bowornwathana, 2006; Kelly et al., 2012). These researchers suggest that community empowerment programmes, such as project workshops and small group consultations, can enable a better stakeholder engagement with the public participation process in a top-down society because these programmes need the industry to collaborate closely with the local community in a friendly atmosphere. As a result, the community would have more confidence to share their opinions to solve the environmental problems in the area (Kelly et al., 2012; Missingham, 2000). The research has highlighted the importance of good relationships and trust between the industry and the local community in the public participation process (Bowornwathana, 2006; Kelly et al., 2012; Missingham, 2000). The results of this study recommend that the industry should implement suitable public participation methods to encourage the local community to participate in the decision-making process. Moreover, less technical environmental information could help the community have more confidence to engage with the public participation process.

7.6. Conclusions

The findings indicate that the stakeholders' demographic backgrounds influence their engagement with environmental information. It is found that education and age in the backgrounds of stakeholders have effects on both the degree of interest and understanding of environmental information. The migration background has an effect on the degree of interest in the information. However, the study found that gender has no effect on stakeholder engagement with public participation.

Stakeholder analysis could also help an industrial organisation understand its stakeholders and design an interesting decision-making process for them. As a result, it would provide a better mutual understanding and strengthen the relation between industry and stakeholders. This raises the likelihood of successful public participation which can provide unbiased perspectives from the stakeholders. More accurate communication from stakeholders can help the industrial sector improve the environmental management system and decision-making process. Stakeholder engagement is a cornerstone for not only the success of public participation but also the improvement of the environmental management system.

8. Stakeholders' expectations for improving Corporate Social Responsibility

This chapter sets out to gain a better understanding of how Corporate Social Responsibility (CSR) operates and how it is influenced by the societal expectations of the business sector. The study investigates the relationships between stakeholders' expectations and CSR.

8.1. Introduction

This study highlights the importance of societal expectations, particularly the local stakeholders, in the development of CSR definition and an enhancement of the performance of CSR implementation. In recent decades there has been an increasing interest in the benefits coming out of CSR initiatives for sustainable development objectives by academic researchers and the business sector (Flammer, 2012; Matten & Moon, 2008; Moir, 2001; Porter & Kramer, 2006). CSR is an approach that integrates a continuing commitment to a sustainable development purpose into a business model and policy of an organisation on a voluntary basis (Carroll & Shabana, 2010). A conventional framework of sustainable development aims to balance the three pillars of sustainability: economics, environment and society (Singh et al., 2009). However, how to integrate CSR into business and how to implement CSR policies can be a major challenge for the business sector (Blowfield, 2007). Integrating CSR into a business strategy of a company is made even more difficult because there are too many definitions of CSR (Dahlmann & Brammer, 2011; Dahlsrud, 2008).

A number of studies have suggested that the definitions of CSR depend on the societal expectation of the business sector which can vary according to country and the characteristic of business (Kakabadse et al., 2005; Matten & Moon, 2008; Mellahi et al., 2005; Tokoro, 2007). For example, a comparative research by Matten and Moon (2008) which analysed CSR policies and activities of companies in Europe and the U.S. found that there are remarkable differences in the perceptions of CSR between companies from the two continents in terms of the CSR frameworks which are influenced by societal expectation of the business. The research concluded

that the CSR policy of companies in Europe which is in a welfare state tends to be motivated by the consensus on the legitimate expectation and economic contributions of all major groups of society, while the CSR policy of companies in the U.S. tends to be influenced by the perceived expectations of the different stakeholders of the company (Matten & Moon, 2008). Furthermore, another study investigated the definitions of CSR by interviewing with related stakeholders such as business sector and NGOs and concluded that people from different countries perceive the meaning of CSR in different ways. The study showed that Taiwanese focused on environmental concerns, whilst local community empowerment is emphasised in Ghana (Mellahi et al., 2005). Such differences and potential misunderstanding between the societal expectation and the business view of CSR could make it difficult for a company to implement its CSR policy (Scherer & Palazzo, 2008). Although most studies in the field of CSR only focussed on the business point of view, it has been suggested that the collaborations among the business sector, society, government and NGOs are essential to solve the conundrum of CSR (Murray et al., 2010). Whilst a number of studies have looked at the business attitudes of CSR, there has been very little research examining the societal perception of CSR (Blowfield, 2007; Carroll & Shabana, 2010).

In recent years CSR has been an essential part of business strategy as it is believed by the business sector that the ultimate outcome of a company's CSR activities is a mutual trust between the company and its stakeholders (Carroll & Shabana, 2010; Pivato et al., 2008; Servaes & Tamayo, 2013). The aim of CSR usually seeks stakeholders' satisfaction to enhance their engagement with the company (Porter & Kramer, 2006). A successful CSR policy can enable a positive public perception of a company (Tokoro, 2007). It not only creates good relationships between a company and stakeholders, but also provides the benefit of competitive advantages to its business in the long term (Pivato et al., 2008; Porter & Kramer, 2006; Tokoro, 2007). An effective stakeholder dialogue can build a good relationship between a company and its stakeholders (Tokoro, 2007). A company which embeds a CSR policy into its business has a great potential not only to improve its reputation but also to increase long-term competitive advantages (Porter & Kramer, 2006).

The business sector has been struggling to implement CSR because there is no consensus on a definition of CSR (Dahlmann & Brammer, 2011; Dahlsrud, 2008; Kakabadse et al., 2005; McWilliams & Siegel, 2001; Moir, 2001; Van Marrewijk, 2003). The number of CSR initiatives has increased dramatically recently; however, how to wholly integrate CSR into business strategy and implement CSR policy remains an important challenge (Blowfield, 2007). Many companies conduct CSR as an instrument to change their business behaviour from an organisation which aims to maximise the profits for its shareholders to be an organisation which makes its decisions responsibly society and stakeholders (Boasson et al., 2009; Carroll & Shabana, 2010). A number of studies have suggested that stakeholder dialogue can help the business sector to cope with the problem of the confusion surrounding CSR definition (Kakabadse et al., 2005; Mellahi et al., 2005; Moir, 2001; Morsing & Schultz, 2006; Tokoro, 2007). A company can enhance the effectiveness of CSR policy and build a good relationship by using two-way communication with its stakeholders, such as local communities around its operational area, local government and regulators. The dialogues with the related stakeholders not only enhance the effectiveness of CSR policy but also build a good relationship between a company and its stakeholders (Tokoro, 2007). A company's dialogue with its stakeholders encourages stakeholder involvement with the company (Morsing & Schultz, 2006). The stakeholder involvement not only reveals stakeholders' expectations but also helps a company adjust its CSR policy and determine the most suitable CSR definition for its stakeholders (Bhattacharya et al., 2009; Kakabadse et al., 2005; Morsing & Schultz, 2006).

This chapter aims to compare the perceptions of CSR between the residents and the business sector in MTP. In this study, the perceptions of CSR were analysed using a mixed methods approach (Methodology). In the quantitative part of the study, factor analysis was implemented to explore the perceptions of the stakeholders. The factor analysis identified the components of CSR definition by reducing many viewpoints from the stakeholders to a smaller number of main CSR elements (Basilevsky, 2009). The result of factor analysis was supported by qualitative approaches. Focus groups and individual interviews were implemented as a qualitative part to gain deeper insights into stakeholders' perceptions of CSR.

8.2. Analysis of quantitative results

This section presents a quantitative analysis of data collected from the questionnaire and Q-sort survey. The purpose of this quantitative analysis was to investigate dimensions which the MTP residents and PTT officers perceive as important components of CSR framework. In the first part, a questionnaire survey was implemented to capture stakeholders' expectations of the business sector by collecting the MTP residents' perceptions of CSR. The second part presents the analysis of the Q-sort survey which provides a view of CSR from the business sector, which was collected from a number of executives and staff from the case study, PTT, a national oil company in Thailand.

8.2.1. The MTP residents' perceptions of CSR

Factor analysis is used to explore components of CSR definition which were extracted from MTP residents' questionnaire responses. A questionnaire survey was implemented in 2012 to collect the MTP residents' perceptions of CSR; the participants were asked their opinion on CSR policies and activities in the study area. The aim of the factor analysis is to reduce the various residents' opinions to a smaller number of factors. The factors that were extracted can reveal not only the residents' expectations of the industry, but also the definition of CSR in the area.

The questionnaire data was analysed by using a quantitative data analysis programme, IBM SPSS Statistics 19. A number of statistical indicators, Kaiser-Meyer-Olkin (KMO) and Bartlett's test, were measured before doing the factor analysis to check the strength of relationship among variables. The KMO is a statistical indicator that shows the adequacy of sampling; the recommended value of KMO should be higher than 0.5 (Basilevsky, 2009; Brown, 2012; Kline, 1994). Another statistical indicator for testing the strength of relationship among variables is the Bartlett's test, which should be lower than 0.05 (Basilevsky, 2009; Brown, 2012).

Table 8-1: Test results showing the strength of relationships of factor analysis

KMO and Bartlett's test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.855
Bartlett's Test of Sphericity	
Approx. Chi-Square	6935.995
df	253
Sig.	.000

The values of the statistical indicators were acceptable (Table 8-1). The KMO was found as 0.855, an acceptable value of greater than 0.5, which indicates that the data is suitable for the analysis. The Chi-square value (6935.995) for Bartlett's test of sphericity would suggest that the factor analysis model is appropriate ($P<0.05$). Eigenvalues, another statistical indicator, are commonly used to decide how many factors are to be extracted in the analysis. The recommendation of the Eigenvalues should be higher than 1 before levelling off (Basilevsky, 2009; Brown, 2012; Kline, 1994). The number of components for the factor analysis should have Eigenvalues greater than 1.

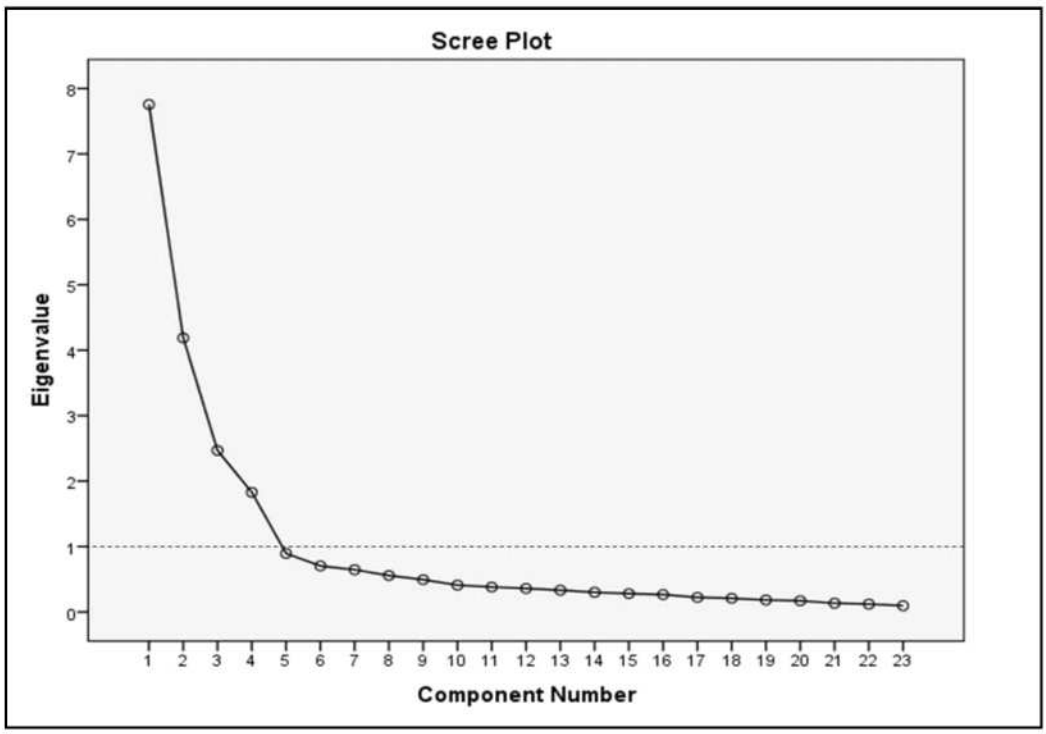

Figure 8-1: The Scree Plot showing the suitable number of factor components in the X axis and the eigenvalues in the Y axis which should be higher than 1.

Figure 8-1 suggests the suitable number of factors that should be analysed is four. In this analysis, varimax rotation was used to simplify the squared loading of a factor (Basilevsky, 2009). The value of factor loading was set at least 0.5 in order to facilitate interpretation of factor loadings. The higher the factor loadings are, the better the variables are characterised by the factors (Kline, 1994). The analysis sorted 23 variables into four common factors as suggested from the Scree Plot. Table 8-2 presents the correlation between the variables and the factor, and illustrates how the variables are organised in their common factor space. The table shows only variables which have the values of rotated factor loadings above 0.5.

Table 8-2: The matrix of rotated factor loading values (varimax)

Variables	Factors			
	Environment	Economics	Society	Integrity
Quality of life – life and accommodation safety	.823			
Quality of life – health care service	.818			
Quality of life – house and accommodation	.814			
Quality of life – mental health	.803			
Quality of life – physical health	.791			
Quality of life – environmental condition	.784			
CSR – health care support	.744			
CSR – environmental responsibility	.705			
Quality of life – job security	The values of factor loading are lower than 0.5	.824	The values of factor loading are lower than 0.5	The values of factor loading are lower than 0.5
CSR – career support		.823		
CSR – economic responsibility		.799		
Quality of life – material well-being		.783		
Quality of life – utility and facility		.762		
CSR – educational support		.758		
Quality of life – financial security		.738		
Quality of life – education		.638		
Quality of life – recreation			.841	
CSR – social event support			.779	
CSR – community empowerment			.727	
CSR – sincerity				.850
CSR – transparency				.799
Quality of life – family				.674
Quality of life – community				.625

Note. Factor loading < 0.50 have not been reproduced (blank cells) and items have been sorted by loadings on each factor. KMO = 0.855, Bartlett's test: $p<0.05$.

The factor analysis is an objective approach to identify the number and main elements of CSR from stakeholders' perceptions. The results of factor analysis indicate that the MTP residents perceived these four factors to be the main elements of CSR, (1) Environment, (2) Economics, (3) Society and (4) Integrity.

(1) Environment: This factor explains that the MTP residents have a lot of concerns about environmental and health impacts from the industry. The residents also expect environmental responsibility and health support from the business sector. They believe that environmental responsibility is one of the main elements of CSR.

(2) Economics: The MTP residents recognise the economic dimension as one of the main elements of CSR. They focus on an economic perspective that covers job security and educational opportunities. The residents perceive that the business sector is responsible for a fair distribution of wealth to society.

(3) Society: The MTP residents perceive that a social aspect is one of the main elements of CSR. They think that the CSR policy should focus on community empowerment, social events and recreation activities. The residents expect the involvement of the business sector in social events such as local festivals and sport activities within the MTP area.

(4) Integrity: The MTP residents recognise the integrity of a company as one of the main elements of CSR. The residents think that trust, transparency and sincerity are important for CSR implementation.

8.2.2. The perceptions of CSR from the case study, PTT

This section explores a business view of CSR from the case study, PTT. The aim of the section is to investigate factors behind PTT's CSR policy. 48 officers, with an equal number of CSR officers and operational officers, were invited to provide a general view of CSR from PTT. Q methodology, one of the factor analysis approaches, offers an effective technique to investigate stakeholder perceptions and can provide a robust factor analysis from a small sample size (Van Exel & de Graaf, 2005; Webler et al., 2009). Therefore, Q methodology was used to reveal the perceptions of CSR from PTT for comparing the residents' perceptions with the result of questionnaire in the previous section. The Q-sort participants were requested to prioritise 27 statements that related to the CSR policy of PTT. The significance of factor loading for a Q-sort study is calculated from the number of Q-sort statements. In the study, the significance of factor loading for statistical significance (p-value) at 0.01 is calculated by the equation below (Webler et al., 2009).

$$The\ significant\ factor\ loading = 2.58 / \sqrt{Number\ of\ Statements}$$

Since there were 27 statements in the study, the significant factor loading for p-value at 0.01 comes out to 0.497. Therefore, the significant factor loading was set at 0.50 for this analysis. The Q-sort data was analysed by using a Q methodology analysis programme, PQMethod. A rotation method, varimax rotation, was used to simplify the Q-sort data.

Table 8-3: The result of the Q-sort analysis

Perceptions	No. of participants (%)		
	PTT officers		Total
	Operation	CSR	
Factor (1)	7 (15%)	14 (30%)	21 (45%)
Factor (2)	9 (19%)	3 (6%)	12 (25%)
Factor (3)	6 (12%)	2 (4%)	8 (16%)
Confounded	-	2 (4%)	2 (4%)
Not in Factor 1-3	2 (4%)	3 (6%)	5 (10%)
Total	24 (50%)	24 (50%)	48 (100%)

Note. Factor loading < 0.50 have not been reproduced and items have been rotated by varimax method

The Q-sort analysis extracted three factors that represent three different PTT views of CSR (Table 8-3). Forty-one of 48 participants' responses (86%) were accounted for in these three perceptions. For the remaining seven responses, two were confounded (factor loadings >0.5 on more than one factor) while another five sorts were not statistically significant (factor loadings < 0.5). The 41 Q-sort responses were distributed among the three perceptions; almost half of responses (45%) perceived that Integrity, and Health impact, are the main elements of CSR, about a quarter (25%) thought that Environmental responsibility is essential to a CSR framework, while a small number of responses (16%) indicated that Economic aspects and Sincerity are important for the CSR policy of the company.

Table 8-4: Summary of Q-sort statements by factors

Statements	Factor (1)	Factor (2)	Factor (3)	Disagreemen statements
Industry and communities should have mutual trust.	x		x	
Industry should run business sincerely.	x		x	
Transparency is important for industrial operations.	x			
Industrial operation causes health impacts on communities.	x			
Industry should provide health support for communities.	x			
Industry is responsible for environmental management.		x		
Emissions from industry must be strictly controlled.		x		
Pollution reduction must be an important policy for industry.		x		
Industry must pay an attention to pollution control.		x		
Industry should participate in environmental conservation.		x		
Industry is responsible for economic development.			x	
Industry should participate in educational support.			x	
Industry distributes economic development to rural areas.			x	
Industry should support sport activities in communities.				x
Industry should support social events in communities.				x
Industry should support recreational activities in communities.				x
Industry's involvement in social events can build relationships				x
Industry should participate in social events in communities.				x

The perceptions extracted from the Q methodology are recognised as exemplars of opinion types rather than as distinct perspectives. The results from Q-sort analysis (Table 8-4) not only provide common perceptions but also show the most disagreed perception among participants. The characteristics of three common perceptions and one disagreement are summarised as below.

(1) Factor (1): Participants think that a mutual trust between a company and its stakeholder is important and industry should operate its business sincerely and transparently. They also think that industry should be responsible for health impacts from its operations.

(2) Factor (2): Participants think that environmental responsibility is important for CSR policy; the company should not only focus on environmental management and pollution control but also participate in environmental conservation.

(3) Factor (3): Participants think that a mutual trust between a company and its stakeholder, and sincerity, are important parts of a CSR framework. They also think that industry should be responsible for economic distribution and educational support to rural areas.

(4) Statements of disagreement: Participants think that the involvement of a company in social events such as sport and recreational activity is **not** important for CSR policy. They also do **not** think that industry should support social events, sport and recreational activities.

The results suggest that PTT officers perceive integrity & health impact, environmental responsibility, and sincerity & economics, as vital elements for the CSR policy of the company but do **not** think that the company's involvement in social events are important. However, these results must be interpreted with caution because the study has only identified the main elements of CSR. A dimension which has a higher number of participants does **not** imply that the dimension is more important than other dimensions. In summary, the quantitative results suggest that there were a number of differences in the perceptions of CSR between the MTP residents and the PTT officers. The quantitative analysis presents a preliminary understanding of the perceptions of CSR between the community and the company. The next section on qualitative analysis provides deeper insights into the MTP residents' expectations of the business sector and the company's view of CSR.

8.3. Analysis of qualitative results

This section presents the results of the qualitative analysis of focus groups and in-depth interviews. While the quantitative results gained from the earlier section provide an overview of stakeholders' perceptions, the qualitative results help to build up a deeper understanding of the issue concerned. The first part of this section provides results from the analysis of focus group discussions which explore the MTP residents' expectations of the industry in MTP. The second part presents the results of in-depth interviews which investigate underlying factors behind CSR policies of PTT.

8.3.1. Focus group results

A group of MTP residents who took part in the questionnaire survey were carefully selected to participate in six focus group sessions. The groups were also selected

using criteria based on gender, location, migration and educational backgrounds to ensure that they broadly represented the MTP residents. 36 participants were invited to discuss and share their perceptions of CSR and their expectations of the business sector. A qualitative data analysis programme (QSR NVivo 9) was used to analyse and code data into categories. The audio data of the focus group discussions were recorded by a voice recorder and the frequency of the words mentioned in the discussions was also counted by the NVivo 9.

In the first part of each focus group participants were asked to discuss the definition of CSR. The participants reported that they did not understand exactly the CSR definition; they found it difficult to define CSR, but spoke mostly about two issues. Firstly, some participants talked about a group of company representatives who are responsible for building a good relationship between a company and its stakeholders.

"I think that CSR is a group of company staff who coordinate and communicate with communities. The team's responsibility is to establish and maintain a good relationship between their company and the communities". (Male participant, near communities group)

"I think a company sends its CSR team to represent the company in the communities. They are messengers for the company". (Female participant, far communities group)

"Sometimes we don't really know what CSR is. It is the part-taking in a particular group, whether through the employees or the company as a whole to participate in the common activity. Basically, it's the relationship between the factory and the community". (Male participant, high school or lower group)

"The responsibility of a CSR team is to build a relationship between the company and communities. After having played a part in the community, the CSR team gathered information and reported back to the company. They have a role as communication media". (Female participant, migrant resident group)

The second issue was a discussion about how the community was being supported by the business sector. A number of participants thought that CSR was the responsibility of an industrial organisation to support the community within which it operates. In the focus group discussions, an interesting opinion of CSR which recurred is that some participants felt that CSR relates to a marketing purpose.

"A CSR officer is the person who finds out what the community needs. The business sector should support activities that improve the quality of life in a community". (Female participant, near communities group)

"CSR is the continued support provided by the business sector to improve the well-being of the communities around their operation. The support has to cover many aspects such as education, quality of life and health". (Male participant, far communities group)

"CSR is a support from the business sector. The business sector can provide support in many aspects such as education, career, social events, environment or health. In fact, it should be a continuous and on-going support". (Female participant, high school or lower group)

"The MTP residents think that CSR is a company's duty to take care of them and help them in every aspect. When there is an issue, it should be possible to coordinate with the company via CSR officers. The CSR officers need to have knowledge in the general affairs of the residents in order to determine what are needed and how the company can help them". (Male participant, local residents group)

"I think that CSR is one of many business marketing strategies. These days, it is very important in modern business. It brings about understanding and good corporate image". (Male participant, higher education group)

"I feel that the CSR activities in MTP are all about creating a corporate image. The business sector is just putting on an act to create a good perception of a company". (Female participant, far communities group)

In the next part of the discussions, the participants were asked what they perceived to be the main elements of CSR in the area. There were mixed views from participants on which of these elements were most important. To create and refine and determine the relative importance of the themes, the QSR NVivo 9 was used to count word frequency and generate an overview of the data as a Word Cloud. In this study, a Word Cloud was used to reveal keywords and create themes.

Figure 8-2: Result from the Word Cloud representing most frequently mentioned words from focus groups, more frequent mentioned words are displayed in a bigger font size.

The results from the Word Cloud provide an overview of patterns of the participants' responses and help to establish themes of the discussions. The responses from focus groups were coded by the thematic analysis. Figure 8-2 suggests four themes which the MTP residents perceived to be the main elements of CSR; (1) environmental and health responsibility, (2) economic support, (3) social support and (4) integrity. For example, a response given by a participant *'The industry should be responsible for the environmental degradation in MTP. The industry's environmental responsibility must receive the first priority'* was coded as "environmental and health responsibility". All responses were crosschecked to ensure that the responses were relevant to these four themes (Table 8-5).

Table 8-5: MTP residents' perceptions of the important elements of CSR

Main elements of CSR	No. of Comments (%)
Environmental and health responsibility -Residents believed that the industry has to be responsible for the environmental impacts.	9 (20.0%)
Economic support -Residents recognised education and career supports are important for CSR framework.	12 (26.7%)
Social support -Residents expected the industry should play their part in social events within the area.	14 (31.1%)
Integrity -Residents considered sincerity and transparency are important for CSR framework.	10 (22.2%)
Total	45 (100%)

8.3.1.1. Environmental and health responsibility

About 20% of the total 45 comments mentioned the importance of the environmental and health responsibility of a company; the participants recognised environmental and health responsibility as one of the societal expectations of the business sector in MTP. They believed that industrial pollution is a major cause of degradation of the environment. As a result, the participants felt that the industry has to be responsible for the environmental and health problems in the area. They also expected to receive a health care benefit from the business sector.

"I think the business sector has to take care of its operational area to keep the environment in a good condition. It is the responsibility of the industry to maintain the quality of the environment and provide health supports in the area". (Female participant, near communities group)

"The industry should be responsible for the environmental degradation in MTP. The industry's environmental responsibility must receive the first priority. An industrial organisation's commitment to environmental responsibility is important to the sustainability of an organisation". (Male participant, higher education group)

"The industrial sector must be fully responsible for environmental and health problems in MTP. The residents can't take care of themselves. The industry has to support health care service in the area". (Female participant, local residents group)

8.3.1.2. Economic support

Over a quarter (26.7%) of the total 45 comments mentioned education and career support from the business sector as being important. The participants wanted their children to have a good education and an opportunity to get a job in an industrial organisation in MTP. The participants also raised problems about the scholarship

distribution scheme and their difficulty in getting a job in the industry within the area.

"The factory should accept our children to work, but it cannot do so. My daughter got a master degree and we live right by the factory, but she does not get a job there. The factory does not accept her because she does not have the right degree for the job. If one was not graduated with the right field of study or with low scores, he/she will not be accepted". (Female participant, near communities group)

"The support for education is beneficial and sustainable. However, the business sector is having problems in allocating scholarships in MTP. It is a challenge for a company to allocate its scholarships due to the difference in the numbers of population in the 33 communities. The largest community has population over 4,000, while the smallest has just 500 residents". (Male participant, higher education group)

"I think educational support is the most important aspect for CSR. But, there is a problem about how to allocate scholarships in MTP. Now, there are 33 communities. A company sponsors scholarships to each community at same amount of money. The residents felt it is unfair. The big problem is the numbers of population in each community are different. A big community has population about 4,000. But, a small community has just about 500 residents. This is a very big problem indeed". (Male participant, migrant residents group)

"The residents would like for the business sector to accept their children to work in the factories in MTP. But the specified qualifications are those of engineer level. Can our children achieve that level of education? None of the residents' children has ever been accepted". (Female participant, local residents group)

8.3.1.3. Social support

Almost one-third (31.1%) of the total 45 comments mentioned the importance of the business sector's involvement in social events. The participants believed that all industrial organisations should play their part in social events within MTP, such as local festivals and sport activities, to build a good relationship between the industry and the community.

"If a company does not come to participate in social events, the residents tend to suspect that the company is having some problems. When a company comes to join in a social event, the residents would like to see some supports from that company. Some company chooses to join only nearby communities." (Male participant, far communities group)

"The business sector needs to have a good understanding about the area. If a company does not understand what the residents think or how the residents live, it will be hard to run its business in MTP". (Female participant, high school or lower group)

"A company needs to participate in social events, if the company wants to build a good relationship with the community. For example, Thai New Year festival or Children day is a good opportunity for a company to join and build a relationship". (Male participant, higher education group)

"The business sector in MTP should know about the local communities. It is difficult for a company to operate its business, if the company does not understand the communities in MTP". (Male participant, local residents group)

8.3.1.4. Integrity

Ten comments (22.2%) mentioned the importance of integrity. The participants believed that the integrity of the business sector is an important part of CSR policy and activities. A company must be sincere and transparent to build good relationships with the community. The participants stressed that sincerity and transparency are essential to build long-term relationships with the community.

"I think sincerity and transparency are important for a company to build a good relationship with the community. Trust between the business sector and the community is a vital part for CSR". (Female participant, far communities group)

"A successful CSR policy needs the trust between the business sector and the community. A company has to run its CSR activity with sincerity in order to establish a good and long-term relationship with the community". (Male participant, high school or lower group)

"I think that sincerity is the most important part of CSR. A lack of trust between a company and the community causes limited understanding. It is a barrier preventing the company from building a long-term relationship with the community". (Male participant, higher education group)

"Any CSR policy or activity will be meaningless, if the business sector does not have sincerity and transparency. Only sincerity and transparency can build trust and long-term relationship between a company and the community". (Female participant, migrant residents group)

8.3.2. In-depth interview results

This section aims to gain insights into the business view of CSR. Six executives, consisting of two chief operational officers, two executive vice presidents and two vice presidents from the CSR and the operational department, participated in six interviews to investigate the underlying factors behind CSR policies. All of the interviewees were requested to discuss and share their perceptions of the CSR policy of PTT for providing the top management level views of CSR. In the first part, the interviewees were asked to explain their perceptions and definitions of CSR. The interviewees mentioned the responsibility of the company to society and the environment. They explained that the company operates its business responsibly and takes social and environmental impacts into account in every decision. They also mentioned one aim of the company was to minimise social and environmental impacts caused by the industrial operations.

"CSR is the responsibility to ensure that the social and environmental impacts are kept to the very minimum level. The company has to make a decision carefully before initiating any action to avoid the impacts from its business". (Female interviewee, a CSR executive)

"CSR is the responsibility to society and environment. In my view, CSR is to bring the balance between going into an area to do business and things to give to people in the area". (Male interviewee, a CSR executive)

"CSR is to emphasise on being a good company in the society and not causing any negative social and environmental impact". (Male interviewee, a CSR executive)

"CSR is the responsibility of a company to take good care of the community around its operational area and look after the environment in the area". (Male interviewee, an operational executive)

"CSR is a code of business ethics. The concept goes beyond just generating profit, but doing business without a negative impact on society and environment". (Male interviewee, an operational executive)

"CSR is a code of conduct that a company has to minimise the negative impact upon the environment and society caused by the operation of the company". (Male interviewee, an operational executive)

In the next part of the discussions, the interviewees were asked what they perceived to be the main elements of CSR.

Figure 8-3: Results from the Word Cloud representing the most frequently mentioned words from interviews, more frequent mentioned words are displayed in a bigger font size.

The results from the Word Cloud provide an overview of patterns of the PTT executives' responses and help to establish themes by the thematic analysis method (Figure 8-3). There were three themes that the PTT executives perceived to be the main elements of CSR; (1) environmental responsibility, (2) economic responsibility and (3) sincerity and relationship. All responses were crosschecked to ensure that the responses were relevant to the themes (Table 8-6).

Table 8-6: PTT executives' perceptions of the important elements of CSR

Main elements of CSR	No. of Comments (%)
Environmental responsibility -Executives recognised environmental responsibility is important for CSR policy	18 (42.9%)
Economic responsibility -Executives considered an economic contribution to the country is their main responsibility.	14 (33.3%)
Sincerity and relationship -Executives believed the sincerity of company helps to build relationships with stakeholders.	10 (23.8%)
Total	42 (100%)

8.3.2.1. Environmental responsibility

According to the participants, the company recognised that its operations cause many environmental impacts. Almost half (42.9%) of a total 42 comments mentioned that the company has to focus on environmental issues which relate to its operations. Therefore, environmental responsibility is an important element of CSR policy.

"As a national oil company, the first thing that the company has to look after is the environment. The CSR policy has to focus on the environment not only on the local scale but also at the national level. For example, the PTT One-Million Rai (about 400,000 acres) reforestation project is the biggest reforestation in Thailand". (Male interviewee, a CSR executive)

"The reforestation project was initiated by the former corporate executives who had a very far vision into the future, observing that European countries where industrial operations were saturated for a period of time had turned their attention towards caring more for the environment. I think that the European countries are the leader in reviving the environment, in comparison to the developing countries". (Male interviewee, a CSR executive)

"PTT's business is in the petroleum industry. Our business is based on the processes of exploration, extraction and refining which cause environmental impacts. When people utilise our products, the combustion of fossil fuel causes greenhouse gases. I think that the PTT reforestation project can compensate for what we had burned". (Male interviewee, an operational executive)

"PTT recognises that the environment is the most important element of CSR. The company does its best in the operation to prevent the environment against pollution. Our engineers are always looking for a new technology to improve the efficiency of our operations and hence lower emissions. The company always goes with 'best available technology' to minimise the environmental impact from our operations". (Male interviewee, an operational executive)

"Environmental responsibility is most important. PTT is looking into the negative impact upon the environment caused by the operation of the company. PTT has to minimise the impacts as much as possible, whether it's reducing greenhouse gas emission or controlling water consumption. The company must be responsible for the environmental impacts from our operations". (Male interviewee, an operational executive)

8.3.2.2. Economic responsibility

One-third of the total 42 comments mentioned the company's economic responsibility. As a national oil company, the executives believed that the company fulfils its duty by making economic contributions to the country in terms of dividends and taxes. In addition, the company is also responsible for maintaining energy security for the country. In terms of economic contributions, the company should contribute to the economic development of not only the country but also the society. Therefore, the CSR policy of the company should include educational support to local communities to ensure that the local communities can sustain their economic development on their own.

"PTT's duty is to establish stability in energy for the country. We strive to fulfil the stability maintenance aspect as well as to contribute to the government income in the form of dividends and taxes". (Male interviewee, an operational executive)

"As far as the company is concern, the economic aspect is important. The company must conduct the business and be profitable. So we can sustain the business and take care of the stakeholders. If the company cannot sustain the business, how can the company be responsible for any other aspects"? (Female interviewee, a CSR executive)

"Economic contribution is one of the important CSR elements. The aim of the CSR policy is to reduce the gap between rich people and poor people. As PTT makes large profits from the country, we have gained a lot of knowledge and know-how to run a sustainable business, it is necessary for us to support the community so they can stand on themselves. The company provides the knowledge and supports to the communities to give them the capability to run their own business. The educational support is a helping hand for the community in economic aspect". (Male interviewee, a CSR executive)

"PTT has some CSR activities that are not directly related to our business. For example, PTT establishes a CSR project that supports 84 communities across the country. The project focuses on creating a body of knowledge under the sufficiency economy philosophy which founded by His Majesty the King of Thailand. The aim of the project is to support the economic development in the community in rural area". (Male interviewee, a CSR executive)

8.3.2.3. Sincerity and relationship

Almost a quarter (23.8%) of the total 42 comments mentioned the importance of sincerity. The executives thought that the company's sincerity could enhance the performance of CSR activities and help to build relationships and trust with its stakeholders. The executives believed that successful CSR activity not only creates a good relationship with the stakeholders but also enables a good perception of the company. It is notable that the executives considered sincerity as a key component of integrity. Only two comments (4.7%) mentioned sincerity and transparency as basic components of integrity.

"Trust is the most important thing not only in doing business, but also in building relationships. I think that a successful CSR activity needs trust between the company and stakeholders. Sincerity and transparency are needed to build trust and relationship with the stakeholders". (Male interviewee, a CSR executive)

"PTT implements CSR not only to support the business, but also to support the society at the same time. We conduct our business with sincerity and without any hindrance. The CSR creates a good perception of the company in the sense that we never neglect any integral part such as environment, economics and society". (Male interviewee, an operational executive)

"CSR is more than public relation. It is a real relationship between the company and the community. Sincerity is one of the most important parts in building a relationship with the community. It is a win-win relationship which the community benefits a great deal from it". (Male interviewee, an operational executive)

"I do not think PTT conducts CSR for marketing purpose. We are sincere to our stakeholders. We use CSR and communication to create a better understanding with the stakeholders, which enables a positive perception of the company". (Male interviewee, an operational executive)

8.4. A summary comparison of the perceptions of CSR in MTP

The investigation has shown that there are a number of differences in the perceptions of CSR between MTP residents and PTT officers. The quantitative analysis revealed that the perception of social dimensions, such as the importance of social involvement and transparency, is a major difference and should be considered in CSR implementation. The results from the questionnaire survey, collected from 395 participants, shows four dimensions which the MTP residents perceive as important for the CSR framework: integrity, environmental, economic and social responsibility. On the other hand, the Q-sort survey found three opinion types and one disagreement from 24 PTT officers. The Q methodology found that the PTT officers recognised integrity & health, environmental responsibility and sincerity & economics as the main elements of CSR but believed that the social dimension is **not** important for CSR policy of the company (Table 8-7).

Table 8-7: Summary of the main elements of CSR from the results of the quantitative analysis

Perception types Questionnaire survey 395 MTP residents	Q-sort survey - 24 PTT officers			
	Factor (1)	Factor (2)	Factor (3)	Disagreement
Environmental and health responsibility		X		
- Environmental management				
- Health impact responsibility	x			
Economics			X	
- Economic contribution				
- Educational support				
Society				X
- Social involvement				
- Supporting for social events				
Integrity	X		x	
- Sincerity and Mutual trust				
- Transparency				

There was a major difference in the perceptions about the importance of the social dimension between the two groups; while the MTP residents perceive that social involvement is one of the main elements of CSR, the PTT officers do **not** think that the social dimension is important for CSR. The PTT officers believe that it is **not** important to support social events or recreation activities in the area. This finding is supported by the qualitative results. Almost one-third (31.1%) of the MTP residents' feedback indicated that the community expects the company to play a part and provide its support for their social events, to build a good relationship with the community. The PTT officers do **not** recognise the importance of the social events as the PTT executives did **not** mention the importance of the social dimension in their in-depth interviews. As a result, a number of residents feel that the business sector is just putting on an act to create a good perception of a company, raising doubts about the integrity of the business sector. The negative perception towards the business sector can be troublesome for a company in building a mutual trust. The lack of trust between a company and the community can limit understanding and can become a barrier for a company to implement its CSR policy and build a long-term relationship with the community.

On the importance of integrity and sincerity of a company, the perceptions were slightly different. The MTP residents recognise the integrity of a company as one of the main elements of CSR. They think that mutual trust, transparency and sincerity are important for CSR, the same as a group of PTT officers do. According to the results of Q-sort analysis, a number of PTT officers (45%) think that the company should operate its business sincerely and transparently. They also recognise that a mutual trust between the company and its stakeholders is important. A small number of PTT officers (16%) perceive only the importance of trust and sincerity for the CSR framework but do **not** recognise transparency as an important element for CSR. However, there were a number of PTT officers (35%) who do **not** perceive the importance of the integrity of the company as a part of CSR.

This finding is consistent with the qualitative results. Almost a quarter of comments (22.2%) in the focus group discussions suggested that the integrity of a company is important because they believe that a company must be sincere and transparent to build a mutual trust and a long-term relationship with the community. The results

from in-depth interviews suggested that about 23.8% (10 comments) mentioned the importance of integrity in CSR; the executives believe that integrity of a company is essential in building a relationship and a mutual trust with its stakeholders and also can improve the perception of a company among its stakeholders. However, only two responses (4.7%) from the in-depth interviews mentioned sincerity and transparency as components of integrity. The importance of integrity is a view common to the community and the company; however, there was a slightly difference in perceptions of the main components of integrity between the both parties. While the community perceives sincerity and transparency as main components of integrity, the majority of responses from the company recognised sincerity as a key component of integrity but does not include transparency. There are several possible explanations for this result; the community may have doubts about the transparency of the company. Moreover, the company is in a dilemma over how to reveal the information in order to satisfy the community.

The quantitative results showed a similarity in the perceptions of the economic dimension between the MTP residents and a number of PTT officers (16%). They recognise the economic dimension as one of the main elements of CSR. The MTP residents have a lot of concern about job security and educational opportunities; they believe that the business sector is responsible for a fair distribution of wealth to society. The group of PTT officers think that industry should be responsible for economic distribution and educational support to rural areas. However, the qualitative results showed a slight difference in the perceptions of the economic dimension between the community and the company. Over a quarter (26.7%) of the MTP residents' comments suggested that the community want their children to have a good education and an opportunity to get a job in an industrial organisation in MTP. They also pointed out the problems in the distribution of scholarships and their difficulty in getting a job in the industrial sector. On the other hand, one-third (33.3%) of comments from the executive mentioned that the company is responsible for energy security and economic development on a national scale. The company can provide economic distribution to the community by the educational support that helps the community have an ability to sustain their economic development. While the community expects economic support from the business sector at the local scale, the company recognises its role as a national oil company to promote economic

development of the country on the national scale. The community expects a good education and an opportunity to get a job in the industrial sector which is in contrast with the company's belief that the educational support is enough for the community to sustain economic development on their own.

The MTP residents' perception of the environmental dimension looks similar to the perception of the PTT officers. A number of PTT officers (about 45%) think that the company should be responsible for health impacts from its operations. Moreover, there were a group of PTT officers (25%) who believe that the company should be responsible for not only health impacts but also environmental degradation from its operations. Similarly, the MTP residents perceive that the industry should be responsible for the environmental and health impact from its operations. The qualitative results established that the perception of environmental responsibility is a view common to the company and the community. About 42.9% of the comments from the in-depth interviews mentioned that the company recognises its operations cause many environmental impacts and has environmental responsibility to its stakeholders. In the same way, about 20% of the MTP residents' responses in focus groups suggested that the community expects the industry to be responsible for environmental and health problems in the area and should provide health care benefits to the residents. The perceptions of both parties are that the environmental responsibility is one of the main elements of CSR.

8.5. Discussion

This study demonstrates the current knowledge of CSR from stakeholders' expectations and the business sector and *vice versa*. The study examines the stakeholders' perception of CSR which helps to address the research gap. The study of stakeholders' perceptions reveals a better and deeper understanding of the societal expectation of the business sector that can help not only to provide a more suitable definition of CSR but also to enhance the effectiveness of CSR implementation (Dahlsrud, 2008; Matten & Moon, 2008). The results of the study found a commonality of understanding on how to integrate environmental responsibility into the industrial operations. The MTP residents incline to the view that the industry is responsible for the environmental and health impacts from the industrial operations.

In the same way, the company acknowledges that its operations can have a considerable environmental and health impact and should be responsible for the impact that takes place in the area. The results also suggest that there are a number of differences between the MTP residents' expectations of the business sector and the CSR policy of the case study (PTT).

8.5.1. Stakeholders expectation and CSR definition

First, there are a number of studies that suggest the notation of social dimension in CSR implementations (Branco & Rodrigues, 2006; Muthuri et al., 2009; Russo & Perrini, 2010). The difference in perception about the importance of social dimension can be the root cause of the problem for a company in implementing its CSR policy and building a long-term relationship with the community (Branco & Rodrigues, 2006; Russo & Perrini, 2010). The study found that the perceptions of social dimension are the main difference between the community and the company; the community recognises that the involvement of a company in social events such as festivals and sport activities within the area is an important part of CSR to build a mutual trust and create a long-term relationship with the community. However, the company is **not** aware that its involvement in the social events is necessary in building good relationships with the community. The company believes that its sincerity can create a good and long-term relationship with the community, but it is not enough. The findings are consistent with a number of studies that the different perceptions of social dimension not only cause the problems of CSR implementation but also can harm a corporate image of a company (Muthuri et al., 2009; Russo & Perrini, 2010). The community expects the business sector to play a part and to provide support for the social events within the area. The community feels that sincerity alone is not enough and the company needs to have social involvement to build a long-term relationship and mutual trust. The community thinks that if a company never gets involved in any social event, the integrity of the company is in doubt. A number of studies suggest that a company should play a part and provide support for the social events within its operational area to extend its responsibility beyond the legal basis and fulfil the societal expectations of the business sector (Chapple & Moon, 2005; Crane et al., 2004; Matten & Moon, 2008). It might be possible that the social involvement of a company may help to develop closer

relationships and consequently build a long-term relationship with the community. The social involvement can encourage interactions and reinforce the relationship between the community and the company. The mutual understanding that develops from the social involvement can create a public perception of the company as a good member of society (Stukas & Dunlap, 2002). It could be implied that, in the absence of the social involvement of a company, the community may raise doubts about the integrity of the company and have a negative perception of the company.

Furthermore, the community and the company perceive that the integrity of a company is important to build trust and develop relationship. However, there is also a difference in the perceptions of the components of integrity; the community thinks that sincerity and transparency are main components of integrity. In contrast, the company perceives only sincerity as a key component of integrity but does **not** include transparency. It seems that the differences in the perceptions of the importance of transparency can cause problems in CSR implementation. This result may be explained by the fact that it is difficult for a company to disclose the information required by the community. From the business point of view, there are a number of difficulties to revealing social and environmental information because of a very diverse range of stakeholders which may have wide interests. A company also has to make a decision about the level of non-financial information that can satisfy the community but does not impact on competitive advantage which may then disappoint investors who take interest in financial aspects of the company's activities (Blowfield & Murray, 2011). It is usually assumed that the investors are normally interested in the profit of their investments and have a concern about how social and environmental activities might have effects on profit figures (Blowfield & Murray, 2011; Murray et al., 2006). As a result, the company is reluctant to disclose non-financial information to the public. By contrast, the community has a totally different view about social and environmental information; the community has a number of concerns about an any aspect of the company's activities that might affect them and thinks that transparency is crucial to the integrity of a company (Blowfield & Murray, 2011; Lyon & Maxwell, 2011). The community would probably be more concerned by the potential social and environmental impacts from the company's activities and request the disclosure of social and environmental information to ensure that the company's activities will not have any negative effect upon them.

The level of non-financial information disclosure is a major challenge for a company to satisfy its stakeholders. Whilst the company is willing to reassure the community, by the disclosure of social and environmental information, that its activities will not have any negative effect upon them, the company hesitates to reveal the non-financial information to the public due to the concern of investors over profit figures. It could be possible to build a mutual trust by creating mutual dialogues with the community (Corus & Ozanne, 2012). The company's dialogues with the community can help the company to understand the community's concerns, and provide essential and suitable levels of social and environmental information required by the community in order to be satisfied on any particular aspect.

Finally, there is a slight difference in the details of the perceptions of the economic dimension between the community and the company, although they have a common view of the importance of the economic dimension in the CSR framework. The company recognises its responsibility of economic contribution to the country as a national oil company. The company believes that the educational support can help the community to sustain community economic development. However, as mentioned earlier, the community wants educational support from the business sector for their children. They also expect to have opportunities and locals' preferences to get a job in the business sector. The residents feel it is unfair if they cannot get a job in a company that runs its business in the area of their community, while relocated residents from other areas could get that job. The results are consistent with those of other studies and suggest that the business sector should create jobs and facilitate educational support for local communities in order to narrow the wealth gap between local and migrant residents (Bénabou & Tirole, 2010; Reinhardt et al., 2008). It could be possible that the rapid economic growth since the industrial development in MTP poses a serious problem for CSR implementation. The rapid expansion of the MTP economy not only brought wealth which has been unevenly distributed into the area, but also increased a higher degree of inequality in wealth distribution. As a wider wealth gap between the local residents and the migrants who work for the business sector has been increasing, the local residents feel that it is unfair to them. The study suggests that the main problem of the economic dimension may be that the rapid economic growth in MTP has caused an unfair wealth distribution in the area; hence the company has to

understand the details of the community's expectations. The company should communicate with the community to set up and adjust its CSR policy and activities to meet their expectations.

8.5.2. Mixed methods and their role in determining CSR definition

The results from the mixed methods approach helps to understand the differences in the perceptions of CSR from the community and the company perspective. For example, the quantitative analysis revealed that the importance of integrity in building a mutual trust and a long-term relationship is a view common to the community and the company. However, the qualitative analysis explored a difference in the perceptions of the main components of the integrity of a company. It was also found that the community perceives transparency as one of the main components of integrity, while the company does not recognise the importance of transparency. The qualitative analysis establishes differences in the details of perceptions of the economic dimension between the community and the company which could cause a problem in CSR implementation, although there is a common perception of the importance of the economic dimension found in the quantitative analysis. The qualitative results suggested that the residents expect an economic contribution to their community, while the company focuses on an economic contribution of its business to the country. The main problem of the economic dimension may be the rapid economic growth in MTP; this has caused an unfair wealth distribution in the area. The study has shown that the slight differences in the details of perceptions of the economic dimension between the community and the company can cause problems, despite the fact that there is a common perception of the importance of the economic dimension. As a result, the study suggests that the company should apply the mixed method to understand the details of the community's expectations and set its CSR policy and activities to meet the expectations.

This study has shown that the perceptions of CSR from both the community and the company point of view are too complex for a single method, either quantitative or qualitative, to capture and analyse. The mixed methods approach offers an effective way to investigate the differences in the perceptions of CSR between the business

sector and its stakeholders. The factor analysis is an effective tool to identify the main elements of CSR. The qualitative methods, focus groups and in-depth interviews, produce a deeper and better understanding of the stakeholders' perceptions of CSR. This information is very helpful for a company to determine a suitable and mutual definition of CSR between the company and its stakeholders.

8.5.3. Implications, limitations and future research

The results of the study may help the company to understand its local stakeholders' expectations of the business sector, as a greater understanding of the perceptions of CSR can provide a more suitable CSR definition (Mellahi et al., 2005). The study has important implications for developing a mutual CSR definition between the company and the community. The findings of this study support the concept that stakeholders' perceptions of CSR are important and a better understanding of stakeholders' expectations helps a company adjust its CSR policy and indentify a more suitable CSR definition for its stakeholders (Bhattacharya et al., 2009; Kakabadse et al., 2005). The purpose of the study was to find a method to determine a mutual definition of CSR between the business sector and its stakeholders which can be quite challenge (Kakabadse et al., 2005; Matten & Moon, 2008; Morsing & Schultz, 2006; Tokoro, 2007). The finding of the study extends the knowledge of how to determine a mutual definition of CSR by investigating stakeholders' perceptions of CSR. The study presents a practical method to investigate stakeholders' perceptions and identify the differences in the perceptions of CSR which are essential for developing a mutual definition of CSR between a company and its stakeholders. The results of qualitative analysis provide indispensable information for a company to evaluate its CSR activities, identify problems of CSR implementation and adjust its CSR policy. Furthermore, the results suggest a practical method for the business sector to investigate its stakeholder expectation and determine a mutual CSR definition. A comparison of the perceptions of CSR between the business sector and its stakeholders could help a company to identify problems of its CSR implementation and reveal the characteristics of the relationship with its stakeholders. It is recommended that further study might investigate the perceptions of related stakeholders, such as local governments and regulators, to

provide a better understanding of the wider societal expectations of the business sector.

The current study has only examined a number of main elements of CSR and the details of each element. The methods obtained in this study did not analyse the priority of the main elements of CSR. Many companies face the problem of which objectives to prioritise in the main elements of CSR. It would be interesting to assess the degree of importance of each element. A future study that investigates the degree of importance of the main elements of CSR would be very interesting and would help the business sector to establish a better CSR policy in order to satisfy its stakeholders and gain a better understanding among them.

8.6. Conclusions

The study denotes the importance of societal expectations in the development of CSR definition and an enhancement of the performance of CSR implementation. The results obtained from the study have shown that there are a number of differences in the perceptions of CSR between PTT and its local stakeholders in MTP. The study offers a practical approach to explore the stakeholders' perceptions of CSR. The mixed methods used for this study may be applied to identify differences in the perceptions of CSR and could help to determine a mutual definition between a company and its stakeholders. The factor analysis quantified the number and identified the details of the main elements of CSR from the stakeholders' perceptions, while the qualitative methods provide a deeper understanding of the stakeholders' perceptions of CSR. The findings could help a company determine a mutual CSR definition with its stakeholders and enhance knowledge of CSR definition.

9. Discussions and Final Conclusion

This study started with a focus on understanding the complexity of environmental challenges and enhancing the effectiveness of sustainability initiatives within an industrial organisation. A national oil company in Thailand (PTT) was selected as a case study to investigate the interaction between the company and local stakeholders surrounding an operational area of the company. This study was designed to quantify and reveal the stakeholders' perceptions of sustainable development tools; environmental management system (EMS), public participation and corporate social responsibility (CSR). This chapter provides discussions of the three sustainability tools and a conclusion of the full study. Section 9.1 introduces how the local stakeholders' perceptions of the environment in the area can help an industrial organisation improve its EMS. Section 9.2 shows how stakeholder analysis can help to enhance the stakeholders' engagement with public participation. Section 9.3 offers an effective method for investigating stakeholders' expectations of an organisation. It also shows how the expectations of stakeholders can help an organisation to determine a mutual CSR definition with its stakeholders and improve its CSR implementation. Section 9.4 presents the implications and limitations of the study and future research. Section 9.5 provides the final conclusion of the study.

9.1. Environmental management systems

A conventional framework of sustainable development normally endeavours to achieve a reasonable balance between three dimensions; environment, economics and society. An EMS comprises a set of guidelines to manage environmental issues within an organisation. This study aims to argue that the continuous improvement cycle of EMS is not enough to enable a consistent improvement of environmental performance and the local stakeholders' involvement with the industrial sector is necessary for evaluating the environmental performance and improving the EMS. The findings of this study support the idea that the adoption of EMS cannot assure a consistent improvement of environmental performance but an industrial organisation need to adapt the system to be suitable for the local context (Anton et al., 2004; Barla, 2007; Hertin et al., 2008; Prakash & Potoski, 2011; Wagner, 2005). The results of this study are consistent with those of other studies and emphasise that the

local stakeholders' perceptions of environment are helpful for an industrial organisation to address its problems in EMS and evaluate its environmental performance (Hertin et al., 2008; Prakash & Potoski, 2011; Reed, 2008).

The study also found that experiences of local stakeholders provide useful information for an industrial organisation to address problems in its EMS. These results further support the idea that the perceptions of local stakeholders can help an industrial organisation to pin down the local environmental problems (Reed, 2008). Moreover, this study found that there is a tendency for the local stakeholders in communities, where there are high concerns of a particular environmental aspect, to think that it is important to have environmental management of the impact. The evidence from Chapter 6 suggests that there are significant differences in perceptions of the environment between local stakeholders from different locations and an industrial organisation which should integrate spatial context into its EMS.

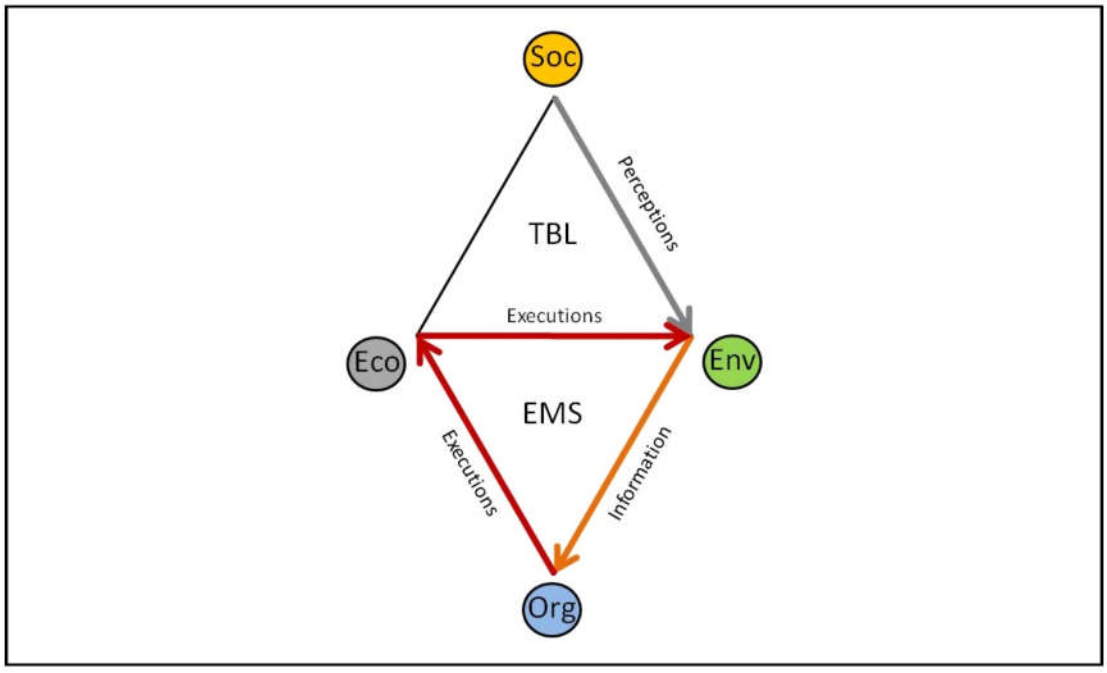

Figure 9-1: Diagram showing how stakeholders' perceptions of the environment can help in the improvement of EMS. An industrial organisation (Org) can conduct its environmental performance appraisal by investigating local stakeholders' perceptions of the environment (Env) around its operational areas. The information from social sector (Soc) is helpful for the industrial organisation to review and evaluate its performance. Then, the organisation has to manage its economic resources (Eco) by allocating its budget to improve the quality of environment and minimise environmental impacts that the local stakeholders are most concerned with the impact.

As shown in Figure 9-1, an industrial organisation can evaluate its environmental performance by collecting local stakeholders' perceptions of the environment and EMS in the area (perceptions, gray line). The local stakeholders' perceptions can help the organisation identifies the significant environmental problems and prioritises environmental aspects in its EMS (information, orange line). Therefore, the organisation can adjust and improve its EMS in order to minimise environmental impacts and consequently reduce stakeholders' concerns over the impacts (execution, red line). As a result, the organisation can develop its EMS and improve both environmental and economic performance because the organisation can draw up its budget to minimise the environmental impacts that caused the most public concern. The study argues that the internal EMS continuous improvement cycle is not sufficient for evaluating and improving environmental performance and the involvement of local stakeholders is essential for a consistent improvement of environmental performance.

9.2. Public participation

The dynamic nature of environmental problems requires a public participation process to ensure the equity and fairness in environmental decision-making. Public participation is a democratic process in encouraging stakeholders to engage with the environmental decision-making and resources management. The process of engaging and educating stakeholder through public participation is essential to achieve the sustainable development initiatives. This study intends to provide a solution for the problems of the inequality among stakeholders which is an important barrier in environmental public participation. This study confirms previous findings and contributes additional evidence that suggests the stakeholders' backgrounds have influence on the level of stakeholders' understanding and interest in environmental information and the different backgrounds of stakeholders can be an important barrier to engage stakeholders (Moran et al., 2008; Prell et al., 2007; Reed, 2008; Tippett et al., 2007). The results of this study also support the idea that suggests stakeholder analysis can enhance the effectiveness of public participation by providing essential information to design a suitable public participation for the stakeholders (Dougill et al., 2006; Prell et al., 2007; Reed, 2008; Tippett et al., 2007).

The findings from Chapter 7 shown that educational background is a major influential factor on stakeholder engagement with public participation when compared to other stakeholders' demographic backgrounds such as gender, age and migration background. The study also found that stakeholders' educations have effects not only on the degree of understanding but also on the degree of interest in environmental information. These findings support the suggestion of the UNESCO that the education plays a major role in the public participation for environmental decision-making process (Lundholm & Plummer, 2010; Schnack, 2008; Schusler et al., 2009; UNESCO, 2005). The levels of stakeholders' education are important because a good educational background makes it possible for stakeholders to access and understand environmental problems comprehensively. The study also found that the ability to comprehend is related to the degree of interest; stakeholders with high school or lower education felt that the environment information is too difficult for them and therefore lose their interest in engaging in the public participation.

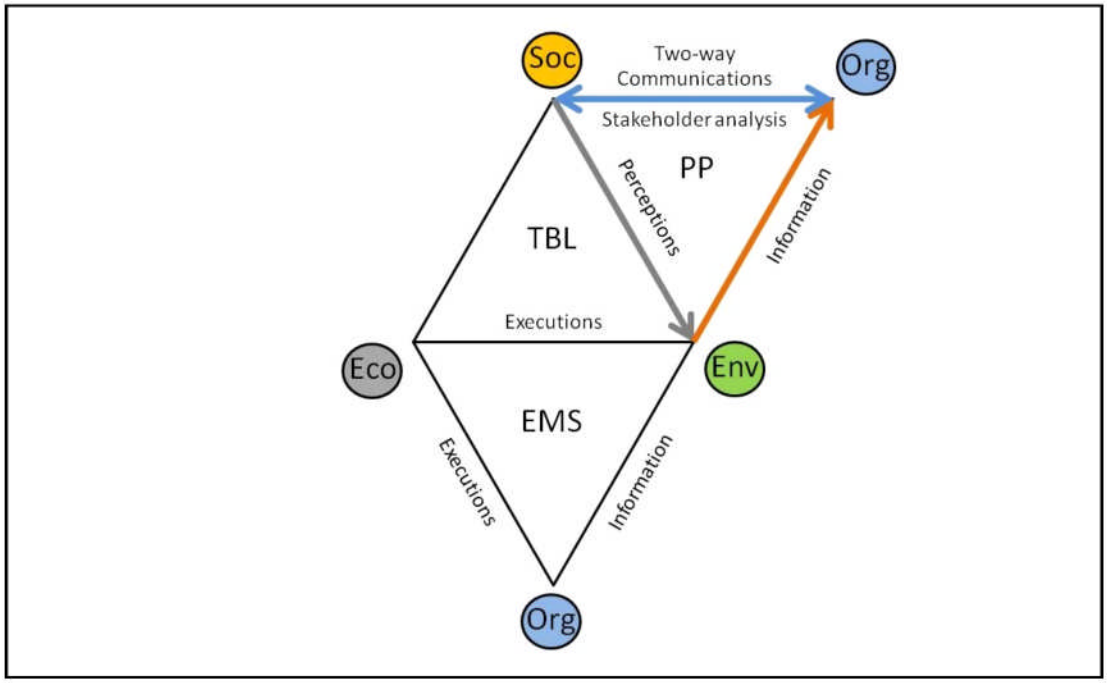

Figure 9-2: Diagram showing how stakeholder analysis can help in the improvement of public participation. An organisation (Org) can conduct stakeholder analysis for providing a better understanding of heterogeneity of stakeholders' demographic backgrounds. The results from stakeholder analysis are useful for designing environmental information (Env) that is accessible to all stakeholders (Soc).

An industrial organisation can enhance its stakeholder engagement with environmental information by providing a suitable set of information for the stakeholders (Figure 9-2). The industrial organisation can understand local environmental concerns by collecting local stakeholders' perceptions of the environment in the area (perceptions, gray line). The information of local the environmental concerns can help the organisation to address the local environmental problems and consequently resolve the environmental concerns of the local stakeholders (information, orange line). Stakeholder analysis can help the organisation to gain a better understanding of heterogeneity of stakeholders' demographic backgrounds (two-way communication, blue line). The information from the stakeholder analysis can help the organisation in designing a persuasive technique and a suitable set of environmental information that is accessible to all stakeholders. Moreover, the organisation can provide environmental information that might interest stakeholders according to the investigation of stakeholders' perceptions of the environment from the previous section. Interesting and accessible environmental information exchange can ensure the organisation will communicate with its stakeholders more efficiently. As a result, the organisation can not only enhance stakeholder engagement in the public participation process but also improve its EMS from more accurate information and unbiased perceptions from the stakeholders.

The understanding of stakeholders' backgrounds is important for designing communication methods and levels of information in order to minimise inequality among the stakeholders which is a major barrier in environmental public participation. This study suggests that individual stakeholders' background analysis is necessary for minimising inequality among the stakeholders and the information from the analysis can help in designing a suitable technique for public participation to enhance stakeholders' engagement with environmental public participation for decision-making process.

9.3. Corporate social responsibility

A successful CSR policy and implementation can enable a positive public perception of an organisation and provide the benefit of stakeholder relationships in the long term. The purpose of this study is to denote the importance of societal expectations in the development of CSR definition and the enhancement of the performance of CSR implementation. The findings are consistent with those of other studies and suggest that the slight differences in the perceptions of CSR can cause problems in CSR implementation because the organisation has focused on the wrong things (Blowfield, 2007; Scherer & Palazzo, 2008). As a result, the CSR policy and activities cannot meet the stakeholders' expectations of the organisation.

This study found differences in the details of perceptions of CSR between the case study and its local stakeholders in terms of the social and economic dimension. The findings support the idea that the differences in the perceptions of the importance of social dimension can be a problem of an organisation in implementing its CSR policy and activities (Branco & Rodrigues, 2006; Muthuri et al., 2009; Russo & Perrini, 2010). The findings are consistent with those of other studies and suggest that the business sector should provide social support and play a part in social event with local stakeholders to extend its responsibility beyond the legal basis and meet the societal expectation of the business (Chapple & Moon, 2005; Crane et al., 2004; Matten & Moon, 2008). In terms of economic dimension, the findings are consistent with previous studies and suggest that the business sector should provide jobs and educational support for local communities to narrow the wealth gap between the local and migrant residents (Bénabou & Tirole, 2010; Reinhardt et al., 2008). This study is in agreement with those of other studies and suggests that an organisation should communicate with its stakeholders, particularly the local community, to understand their concerns and provide essential information to ensure that the operations of the organisation will not have any negative impact on them (Blowfield & Murray, 2011; Corus & Ozanne, 2012; Lyon & Maxwell, 2011). These findings further support the idea that the concept of CSR in a country which is not a welfare state, such as Thailand, tends to be influenced by the stakeholders' expectations of the organisation (Chapple & Moon, 2005; Matten & Moon, 2008).

The results obtained from Chapter 8 offer a practical approach to investigating stakeholders' expectations of an organisation which is essential information for an organisation to adjust its CSR policy and activities in order to satisfy the stakeholders and consequently can improve the stakeholders' involvement and relationship with the organisation (Morsing & Schultz, 2006).The study used the mixed methods approach for investigating the differences in the perceptions of CSR between the case study and its stakeholders. Factor analysis is an effective quantitative approach to identify the main elements of CSR from stakeholders' perceptions. The qualitative methods provide descriptive details of the stakeholders' perceptions of CSR. The main elements and descriptive details of CSR are important for an organisation to understand its stakeholders' expectations and outputs can help an organisation improve its performance of CSR implementation.

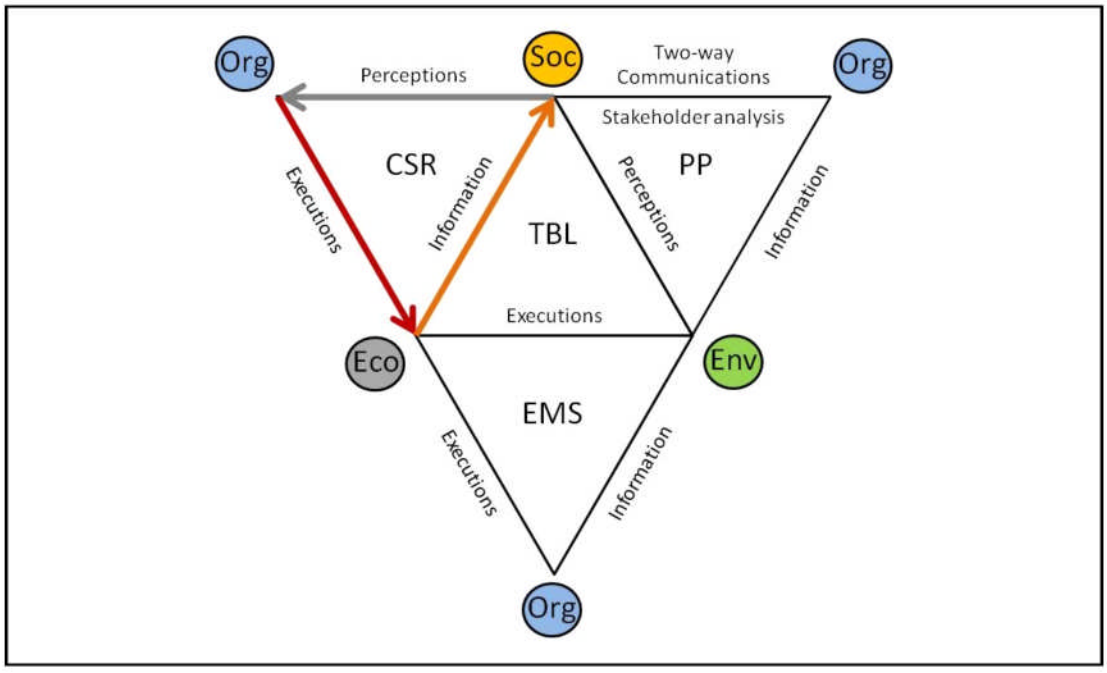

Figure 9-3: Diagram shows how stakeholders' expectations of an organisation can help in the improvement of CSR. An industrial organisation (Org) can improve the performance of CSR implementation by investigating stakeholders' expectations of the organisation. The information from the stakeholders (Soc) is helpful for the organisation to evaluate the effectiveness of CSR activities and identify problems in CSR implementation. Then, the organisation can adjust its CSR policy and allocate its economic resources (Eco) in order to satisfy the stakeholders.

As shown in Figure 9-3, an organisation can enhance the performance of its CSR implementation through the investigation of its stakeholders' expectations of the organisation (perceptions, gray line). The organisation can compare its CSR policy with the stakeholders' expectations and adjust the CSR policy and activities in order to meet the expectations and satisfy the stakeholders (execution, red line). The information from the investigation of stakeholders' expectations also help to understand the concerns of stakeholders, therefore, the organisation can provide suitable information in order to satisfy the stakeholders (information, orange line). The results of this study denote the importance of societal expectations in the development of CSR definition and the enhancement of the performance of CSR implementation.

9.4. Implications, limitations and future research

This study suggests a method for developing a more holistic approach to sustainable development by combining the sustainable development tools (e.g. EMS, public participation and CSR) with stakeholders' perceptions and the TBL framework. An analysis of the spatial background was applied to provide better understanding and useful information for industry to address the problems in EMS and evaluate its environmental performance. Although this was focused on a specific case study, many of the results are generic and the framework has much wider applicability. Moreover, a stakeholder analysis can help to enhance the stakeholder engagement with public participation process by providing greater understanding of heterogeneity of stakeholders' demographic backgrounds and minimising inequality among the stakeholders. The study extends our knowledge of CSR by offering a practical method to determine a mutual definition of CSR between the business sector and society and enhance the performance of CSR implementation. The mixed methods approach used in the study may be applied by an industrial organisation to improve sustainability performances and achieve sustainability objectives.

However, the results should be interpreted with caution because of the specificity of the case study. The study only investigated the relationship between one industrial organisation and stakeholders surrounding its operational area. For example, the results obtained from chapter 6 suggest that there is a tendency for the residents in

communities, where there are high concerns of a particular environmental aspect, to think that it is important to have environmental management of the impact. These findings should not be extrapolated to all industrial areas because the conditions can vary considerably in terms of spatial context such as the effect of the prevailing winds from south to north on the dispersion of air pollution and the residents' perceptions. Further works similar to this one should investigate other industrial areas that the generic aspects of the work can be accessed. As a developing country, the Thai government used top-down industrial development approaches in the development strategies. The findings from chapter 7 might not be transferable to other countries because Thai people are familiar with top-down society. Furthermore, I would suggest that a similar study to chapter 8 that relates to the definition of CSR should be carried out again by a third party.

This study could have benefited by analysing a greater sample size; future studies could possibly employ a longer period to allow the researcher to build relationships with the stakeholders and gain more insights into stakeholders' backgrounds to uncover potential interesting details or information. In the focus group, based on the experience gained, I would consider the use of individual in-depth interviews as a follow-up to the focus group discussion could provide more descriptive information which may be potentially interesting for the study. As a researcher, the PhD process has equipped me with insightful knowledge and skills in designing research instruments. This study has only investigated the perceptions of local stakeholders around an industrial complex. The local stakeholder is one of many stakeholders in the wider society; however, there are other groups of stakeholders who are important for the success of sustainable development. For example, the national government, the local authority and wider public could have been sampled. It is recommended that future studies might investigate the perceptions of other groups of stakeholders to encourage more collaboration between the business sector and the wide social sector. For example, the collaboration between the industry and regulators could be very important for solving the dynamic nature of environmental problems at the national level with the government and the local level with local authority. Moreover, the investigation of public perceptions of the industry provides a better understanding of the wider societal expectations which could be essential in the development and achievement of sustainable development.

9.5. Final conclusion

This study emphasised the importance of the collaboration between the industry and social sector in improving sustainable development tools and enhancing the performance of sustainable development initiatives. The study denotes the importance of stakeholders' perceptions in sustainable development. The business sector should see through the stakeholders' eyes because sometimes perception may be more important than reality. A better understanding of stakeholders' perceptions can help to cope with the complexity of the environmental challenges, an inequality within a group of stakeholders and the confusion over stakeholders' expectations.

For research question (1), the chapter 6 found the influences of spatial context upon the perceptions of local stakeholders who live surrounding an industrial organisation. This study suggests that an industrial organisation should integrate spatial context into its EMS to manage environmental impacts by obtaining a geographic information system into mitigation measures and monitoring procedures. The spatial context awareness can enhance the performance of an EMS by providing essential information for an industrial organisation to evaluate its environmental performance and address problems in its EMS.

For research question (2), the results from the chapter 7 showed that education is a major influential factor on stakeholder engagement with environmental public participation because it makes it possible for the stakeholders to comprehend environmental information. This study found that the educational inequality among stakeholder is one of important barriers in environmental public participation. This study suggests that an industrial organisation should provide suitable environmental information that can be accessible to all educational level to encourage the stakeholders to participate in environmental decision-making process. The stakeholder analysis can enhance stakeholder engagement by providing a better understanding of the heterogeneity of stakeholders.

For research question (3), the chapter 8 found that the differences in the perceptions of CSR between an organisation and its stakeholders can cause problems in implementing CSR policy and activities. This study has shown that the perceptions

of CSR and stakeholders' expectations are too complex for a single method to comprehend. This study offers an effective approach to investigate stakeholders' expectations and identify the differences in the perceptions of CSR. This study suggests that an organisation should communicate with its stakeholders to understand the stakeholders' expectation of the organisation and adjust its CSR policy and activities in order to meet the expectations and satisfy the stakeholders.

The study argues that the internal EMS continuous improvement cycle is not sufficient for evaluating and improving environmental performance. In this study, it shows that the involvement of stakeholders plays an important part in the improvement of EMS. The study also suggests that individual stakeholders' background analysis is essential for the enhancement of stakeholders' engagement with environmental public participation for decision-making process by providing important information to minimise inequality among the stakeholders. Moreover, the study highlights the importance of societal expectations, particularly local stakeholders, in the development of CSR definition and an enhancement of the performance of CSR implementation.

The findings of this study will make a useful contribution to knowledge in the area of sustainable development not only in Thailand but in the wider world. The study offers an effective approach for the business sector to collaborate with the social sector to achieve sustainable development objectives and to enhance of the lives of populations that live in areas surrounding industrial complexes.

Appendix I – Ethical considerations

THE UNIVERSITY of York

Environment Department
Application Form for Ethics Committee Approval

1. DETAILS OF APPLICANT(S)

Name:	TORTRAKUL WATTANAVORAKIJKUL
Department:	ENVIRONMENT
Email:	TW534@YORK.AC.UK
In case of undergraduate/postgraduate students	
Name/level of course/degree:	PhD. In Environmental Economic and Environmental Management
Name of Supervisor(s):	Dr Robert Marchant

2. DETAILS OF THE PROJECT

Please provide a brief outline of the research project.

Oil companies recognise that they have significant impacts on the environment. Their business can pollute ecosystems and can harm human health. Oil firms operate series of business within the wide petroleum industry involve exploring, producing and refining minerals. The minerals in petroleum industry are fossil fuels such as oil, gas and coal. The consumption of petroleum products is the main source of greenhouse gases emissions, which affect global climate. Oil companies not only interlink to international ecological problems but also can cause local environmental impacts. Petroleum operational areas such as oil refineries, gas processing plants and petrochemical complexes may impact local communities around these plants in a number of different ways. For example, a large number of studies found health impacts on residents around oil facilities.

Environmental Management System (EMS) links to sustainability foundations as a tool for organisations manage their environmental impacts and improve environmental performance. Stakeholder groups within the EMS chain such as regulator, public and community have an important influence for a company EMS development. The information of stakeholders is necessary to underpin local environment problems. However, there has been few studies that investigate stakeholders' perception, particularly environmental aspects from local community perspective is very limited. This thesis aims to analyse the relationship between an oil industry and local communities around operational area in Thailand. Finding of the thesis could be used to enhance the sustainability of oil companies.

Funding source of project:

PTT public company limited is a sponsor of this thesis.

Provide a brief summary of the study design and the method(s) involved in the research.

This thesis investigates the interaction between an oil industry and local communities by focusing on a case study of Thailand's National Oil Company, PTT. The focus area is Map Ta Phut industrial complex, Thailand. Research aims are to study the following questions below:

1. "How does stakeholders' perception of EMS may depend on location?" by analysing the main environmental aspects are important in stakeholder's perception from different locations. Questionnaires will identify the key issues that concern communities. Focus groups will explore people's views of EMS.

2. "Is there any difference in stakeholders' engagement of EMS in different backgrounds?" by analysing stakeholders' perception from different backgrounds. Questionnaires will classify the environmental information engagement of different groups of stakeholder such as educational background or gender. The participants in same background will interview as focus group.

3. "How do different stakeholder groups view of Corporate Social Responsibility?" by investigating the conception of Corporate Social Responsibility from different stakeholder groups. Both communities and business corporations will be interviewed to compare their definition of Corporate Social Responsibility.

3. ETHICAL IMPLICATIONS

Ethics Checklist	YES	NO
1a. Does the study involve human subjects?	/	
1b. If you answered 'yes' to 1a, does the study involve participants who are particularly vulnerable or unable to give informed consent (e.g. children, people with learning difficulties, people particularly vulnerable to official surveillance)?		/
2a. Does the study involve animal subjects?		/
2b. If you answered 'yes' to 2a, what species are involved?		
2c. If you answered 'yes' to 2a, please describe briefly any legislation or licensing systems in place to regulate work on these species, and confirm that your work is being done according to any best practice or legislative guidelines for the species concerned.		
3. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited (e.g. members of support group, residents of a home or closed community)?	/	
4. Will the study involve the use of private archives/collections for which permission needs to be sought?		/
5. Will any covert methods be necessary (e.g. observing/interacting with people without their knowledge that they are subjects of research or without their knowledge of the nature of the research?		/
6. Will the study involve discussion of sensitive issues?		/
7. Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?		/
8. Does the study entail meeting unknown respondents off university premises?		/
9. Is the study likely to require copyright clearance for the use of images, text or tables?		/
10. Does your study involve the use of a questionnaire, workshops or focus groups? If 'yes' you must append a copy of the draft questionnaire or relevant topic guide.	/	

If you have answered **'yes'** to any of the above questions, please describe what steps you will take to address them

Participants are stakeholders in focus area, Map Ta Phut (MTP). The community leaders in MTP will be notified of my study plan. Participants will be mixed and balanced by introducing omnibus sampling in public areas (e.g. market or temple) and snowball sampling from community leaders. Participates will be informed about the purpose of the study, how they will participate in the study and how data will be handled. The participants will be recruited in the study only if they volunteer themselves to participate in the study. The participants will be informed of their right to withdraw at any time. Participants will be explained the overview of questionnaires (e.g. terminology and definition) before the study and I will be prompt for clarification throughout the process.

Please explain how research participants will be a) identified and b) for human subjects, how they will be informed about your research

Participants will be informed about the purpose of the study before their participation. They will be informed how data will be handled and how they will participate in the study. They will be informed of their right to withdraw whenever they want.

4. DATA MANAGEMENT

Are there any other ethical issues you consider important?

Yes. The participant will be assured that their anonymity will be protected in any publishing of findings and future publications based on the research. As mentioned earlier, the participants involved in the study will be informed about the purpose of the study, how data will be handled and how they will participate in the study. They will be informed of their right to withdraw at any time.

For studies involving human participants, please describe what steps you will take to ensure that you have the full consent and understanding of the participants regarding the future use of the data they provide.

Data from participants will be anonymously. Participants will be told that their participation in the study will be kept anonymous and confidential. They are not required to write their name and they have a right to withdraw from the study whenever they want. The consent form will be attached in the first page of questionnaire.

Participants in interview will be explained orally before conducting the interview. Participants will be told that the interview will be recorded by the voice recorder. However, their participation in the interview will be kept anonymous and confidential.

Please describe what steps you will take to keep your data secure? (you need to consider both security for confidentiality reasons on a day-to-day basis as well as long-term security, e.g. back-up procedures)

The raw data will be changed to be electronic database within three months. Electronic database will be hosted on password protected areas on the servers of the University of York or hard disk drive and will keep in the locked filing drawers (depending on the size of the data and the availability of the university's servers).

What do you anticipate will be the output from the study? *Tick those that apply:*

Peer-reviewed publications	/
Non-peer-reviewed publications	
Presentations at Conferences/Meetings	/
Press releases	
Other publications	/
Student project or coursework	

4. SIGNATURES

The information in this form is accurate to best of my knowledge and belief and I take full responsibility for it.

I agree to report of any adverse or unexpected events that may occur during this project, to seek approval for any significant protocol amendments and to provide interim and final reports. I also agree to advise the Ethics Committee if the study is withdrawn or not completed.

I confirm that I have considered the following:	YES	N/A
1. Responsibilities to participants	/	
2. Responsibilities to gatekeepers	/	
3. Responsibilities to the academic community	/	
4. Ethical issues arising from funding source or the nature of the research	/	
5. Intellectual property rights	/	
6. Consent and understanding of participants	/	
7. Protection of data	/	
8. My personal safety	/	

Signature of Applicant (s): .....

TORTRAKUL WATTANAVORAKULKUL

Date: 6/6/12

Signature of Supervisor: .....

Date: 6/6/12

The completed application form should be emailed to the Chair Research Committee, Environment Department alistair.boxall@york.ac.uk

Appendix II – Informed consent form

INFORMED CONSENT FORM

The research is related with the perception of stakeholders. This process is part of a PhD research study in the Environment Department, The University of York. The data collected during the participation, will be kept strictly confidential. Excerpts from the results may be made part of the PhD thesis or further report, but no any identification is included in the report. The conclusion will report to the participants.

Before we proceed with the participation, we would like to emphasise the following:

- Your participation is entirely voluntary
- You are free to refuse to answer any question
- You are free to withdraw at any time

I confirm that I have read and understand the information sheet explaining the above research study and I have had the opportunity to ask questions about the research.

Signature

Appendix III – Research instruments: Questionnaire

Questionnaire survey												
Section I: Basic information (If you want to participate in focus groups please fill your contract)												
Contract									Age			Year
Gender	1	Male		2	Female				3	Prefer not to be answer		
Education												
1	Primary School			3	High School				5	Undergraduate University		
2	Secondary School			4	Certificate / Diploma				6	Postgraduate University		
How long have you been living in Map Ta Phut?												Year
Where do you live in Map Ta Phut?												

Section II: Quality of life		Important								
		Not →								Very
1	What are the things that affect your quality of life?									
1.01	Community	1	2	3	4	5	6	7	8	9
1.02	Education	1	2	3	4	5	6	7	8	9
1.03	Environment	1	2	3	4	5	6	7	8	9
1.04	Family / Significant relationship	1	2	3	4	5	6	7	8	9
1.05	Financial status	1	2	3	4	5	6	7	8	9
1.06	Health care service	1	2	3	4	5	6	7	8	9
1.07	House / Living condition	1	2	3	4	5	6	7	8	9
1.08	Job Security	1	2	3	4	5	6	7	8	9
1.09	Material wellbeing (TV, Car)	1	2	3	4	5	6	7	8	9
1.10	Mental health	1	2	3	4	5	6	7	8	9
1.11	Physical health	1	2	3	4	5	6	7	8	9
1.12	Public utilities (Electricity, Water)	1	2	3	4	5	6	7	8	9
1.13	Recreation	1	2	3	4	5	6	7	8	9
1.14	Safety / Life security	1	2	3	4	5	6	7	8	9
1.15	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section III: Environmental management system		Need Improvement								
		Not →								Very
2	Which aspects of your area do you think need improvement?									
2.01	Air quality	1	2	3	4	5	6	7	8	9
2.02	Fresh water quality	1	2	3	4	5	6	7	8	9
2.03	Green area	1	2	3	4	5	6	7	8	9
2.04	Industrial waste	1	2	3	4	5	6	7	8	9
2.05	Noise pollution	1	2	3	4	5	6	7	8	9
2.06	Population density	1	2	3	4	5	6	7	8	9
2.07	Sea water quality	1	2	3	4	5	6	7	8	9
2.08	Smell (VOCs) from factories' emissions	1	2	3	4	5	6	7	8	9
2.09	Traffic congestion	1	2	3	4	5	6	7	8	9
2.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section III: Environmental management system		Concern								
		Not →								Very
3	Which aspects of your area do you concern?									
3.01	Cancer from factories' emissions	1	2	3	4	5	6	7	8	9
3.02	Drinking water contamination	1	2	3	4	5	6	7	8	9
3.03	Sea contamination	1	2	3	4	5	6	7	8	9
3.04	Industrial waste contamination	1	2	3	4	5	6	7	8	9
3.05	Hearing problem	1	2	3	4	5	6	7	8	9
3.06	Lack of green area	1	2	3	4	5	6	7	8	9
3.07	Over population density	1	2	3	4	5	6	7	8	9
3.08	Respiratory disease	1	2	3	4	5	6	7	8	9
3.09	Stress from traffic congestion	1	2	3	4	5	6	7	8	9
3.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section III: Environmental management system		Important								
		Not →								Very
4	Which aspects in environmental performance do you think are important?									
4.01	Air pollution control	1	2	3	4	5	6	7	8	9
4.02	Emergency respond management	1	2	3	4	5	6	7	8	9
4.03	Environmental emission target	1	2	3	4	5	6	7	8	9
4.04	Green area	1	2	3	4	5	6	7	8	9
4.05	Industrial waste management	1	2	3	4	5	6	7	8	9
4.06	Noise pollution control	1	2	3	4	5	6	7	8	9
4.07	Smell (VOCs) emission control	1	2	3	4	5	6	7	8	9
4.08	Traffic management	1	2	3	4	5	6	7	8	9
4.09	Wastewater management	1	2	3	4	5	6	7	8	9
4.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section III: Environmental management system		Important								
		Not →								Very
5	Which aspects in Environmental engagement do you think are important?									
5.01	Communications	1	2	3	4	5	6	7	8	9
5.02	Complain procedure	1	2	3	4	5	6	7	8	9
5.03	Emergency respond communication	1	2	3	4	5	6	7	8	9
5.04	Environment management review	1	2	3	4	5	6	7	8	9
5.05	Environmental information	1	2	3	4	5	6	7	8	9
5.06	Environmental policy	1	2	3	4	5	6	7	8	9
5.07	Public dialogue	1	2	3	4	5	6	7	8	9
5.08	Public engagement	1	2	3	4	5	6	7	8	9
5.09	Public statement	1	2	3	4	5	6	7	8	9
5.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section IV: Public participation		Prefer								
		Not →								Very
6	Which participation methods do you prefer?									
6.01	Personal interview	1	2	3	4	5	6	7	8	9
6.02	Written mail survey	1	2	3	4	5	6	7	8	9
6.03	Operation site meeting	1	2	3	4	5	6	7	8	9
6.04	Small group	1	2	3	4	5	6	7	8	9
6.05	Public hearing	1	2	3	4	5	6	7	8	9
6.06	Public consultation	1	2	3	4	5	6	7	8	9
6.07	Information exchange consultation	1	2	3	4	5	6	7	8	9
6.08	Project workshop	1	2	3	4	5	6	7	8	9
6.09	Delegate meeting	1	2	3	4	5	6	7	8	9
6.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section IV: Public participation		Very →								Very
		Bad								Good
7	How do you evaluate participation process in your area at each of the following?									
7.01	Earning your trust	1	2	3	4	5	6	7	8	9
7.02	Explaining decisions	1	2	3	4	5	6	7	8	9
7.03	Having a fair decision making process	1	2	3	4	5	6	7	8	9
7.04	Making it easy to get involved	1	2	3	4	5	6	7	8	9
7.05	Making the information easy to understand	1	2	3	4	5	6	7	8	9
7.06	Providing the information you need	1	2	3	4	5	6	7	8	9
7.07	Providing you accurate information	1	2	3	4	5	6	7	8	9
7.08	Responding to your concerns	1	2	3	4	5	6	7	8	9
7.09	Understanding your concerns	1	2	3	4	5	6	7	8	9
7.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section IV: Public participation (Example leaflet)		Very Bad →								Very Good
8	How do you evaluate an example leaflet at each of the following?									
8.01	Earning your trust	1	2	3	4	5	6	7	8	9
8.02	Feeling sincerity in environment managemer	1	2	3	4	5	6	7	8	9
8.03	Feeling transparency in environmental stater	1	2	3	4	5	6	7	8	9
8.04	Making the information easy to access	1	2	3	4	5	6	7	8	9
8.05	Making the information easy to understand	1	2	3	4	5	6	7	8	9
8.06	Making the information is interesting	1	2	3	4	5	6	7	8	9
8.07	Providing the information you concern	1	2	3	4	5	6	7	8	9
8.08	Providing the information you need	1	2	3	4	5	6	7	8	9
8.09	Providing you accurate information	1	2	3	4	5	6	7	8	9
8.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Section V: Corporate social responsibility		Not → Important → Very								
9	Which aspects of CSR do you think are important?									
9.01	Career support	1	2	3	4	5	6	7	8	9
9.02	Economic contribution	1	2	3	4	5	6	7	8	9
9.03	Education	1	2	3	4	5	6	7	8	9
9.04	Empowerment	1	2	3	4	5	6	7	8	9
9.05	Environment	1	2	3	4	5	6	7	8	9
9.06	Health	1	2	3	4	5	6	7	8	9
9.07	Sincerity	1	2	3	4	5	6	7	8	9
9.08	Social event (Sport, Cultural event)	1	2	3	4	5	6	7	8	9
9.09	Transparency	1	2	3	4	5	6	7	8	9
9.10	Other (Please specify)	1	2	3	4	5	6	7	8	9

Appendix IV – Research instruments: Q-sort

Q-sort survey	
(1) Basic information	
Position: Age: year How long have you been working for PTT? year Education: Gender:	
(2) Please rank these Q-sort statements from mostly agree (1) to mostly disagree (27)	Order
Environmental preservation is one of industry's responsibilities.	
Industry distributes economic development to rural areas.	
Industry should support sport activities in communities.	
Educational support is one of industry's responsibilities.	
Industry is responsible for environmental management.	
Industry should participate in skills development of communities.	
Emissions from industry must be strictly controlled.	
Industrial operations cause health impacts on communities.	
Industry is responsible for economic development.	
Pollution reduction must be an important policy for industry.	
Industry should provide economic support for communities.	
Industry should provide health support for communities.	
Industry should create jobs for communities.	
Industry should participate in educational support.	
Industry should participate in social events in communities.	
Industry should improve the quality of environment in communities.	
Industry should support recreation activities in communities.	
Industry should support community empowerment.	
Transparency is important for industrial operations.	
Industry and communities should have mutual trust.	
Industry must pay attention to pollution control.	
Industrial development has lead utilities to rural areas.	
Industry should participate in environmental conservation.	
Industry should run business sincerely.	
Industry's involvement in social events can build relationships with	
Industry should support social events in communities.	
Industry should participate in career support in communities.	

Appendix V – Research instruments: In-depth interview

In-depth interview

(1) Basic information

Position:

Age: year

How long have you been working for PTT? year

Education: Gender:

(2) Corporate Social Responsibility

1 What is CSR in your opinion?
2 How is importance of CSR policy?
3 What are the benefits of CSR policy?
4 What aspects of CSR do you think is important?
5 Which is the most successful CSR activity in your opinion?
6 What suggestions are there to improve CSR activities in MTP/ Thailand?

Appendix VI – Research instruments: Focus group

Focus group-EMS
(1) Basic information
Group: Near communities / Far communities
(2) Environmental management system
1 How do you feel about the environment in MTP? 2 What are the most important environmental impacts and problems in MTP? 3 What are the causes of environmental problems in MTP? 4 What aspects of environmental management in MTP do you think is important? 5 What suggestions are there to improve the environmental quality in MTP?
(3) Corporate Social Responsibility
1 What is CSR in your opinion? 2 What aspects of CSR do you think is important? 3 What are problems of CSR activities in MTP? 4 What suggestions are there to improve CSR activities in MTP?

List of Abbreviations

Corporate Social Responsibility	CSR
Eastern Seaboard Development Plan	ESDP
Education for Sustainable Development	ESD
Environmental Management System	EMS
Foreign Direct Investment	FDI
Gross Domestic Product	GDP
Intergovernmental Panel on Climate Change	IPCC
International Organisation for Standardization	ISO
Map Ta Phut	MTP
National Economic and Social Development Board	NBSDB
Non-Governmental Organisations	NGOs
Office of Natural Resources and Environmental Policy and Planning	ONEP
Petroleum Authority of Thailand	PTT
Stock Exchange of Thailand	SET
Thai Industrial Standards Institute	TISI
Triple Bottom Line	TBL
United Nations Conference on Environment and Development	UNCED
United Nations Economic Commission for Europe	UNECE
United Nations Educational, Scientific and Cultural Organisation	UNESCO
Volatile Organic Compounds	VOCs
World Business Council for Sustainable Development	WBCSD
World Commission on Environment and Development	WCED
World Summit on Sustainable Development	WSSD

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