A Perspective of Transportation Service Customer on Green Transportation towards Buying Behaviour: A Study of Southern Industry Thailand

Prapatsara Anantapokai

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Business Administration (International Program)

Prince of Songkla University

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This is to certify that the work here submitted is the result of the candidate's own investigations. Due acknowledgement has been made of any assistance received.

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I hereby certify that this work has not been accepted in substance for any degree, and is not being currently submitted in candidature for any degree.

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(Ms. Prapatsara Anatapokai)
Candidate

ชื่อวิทยานิพนธ์ พฤติกรรมการซื้อที่มีผลต่อการขนส่งสีเขียวในมุมมองของผู้ใช้บริการขนส่ง กรณีศึกษาอุตสาหกรรมขนส่งภาคใต้ประเทศไทย

ผู้เขียน นางสาว ประภัสสรา อนันตโภไคย

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บทคัดย่อ

งานวิจัยนี้มีจุดมุ่งหมายเพื่อศึกษามุมมองต่อการขนส่งสีเขียวรวมถึงปัญหาและโอกาส อีกทั้งปัจจัยที่ส่งผลต่อการเลือกใช้บริการจากมุมมองของผู้ใช้บริการขนส่งในภาคใต้ประเทศไทย ถึงแม้ว่าจะมีงานวิจัยด้านการขนส่งสีเขียวเกิดขึ้นอย่างต่อเนื่อง แต่กรณีศึกษาในภาคใต้ของประเทศไทยนั้นยังคงมีจำนวนน้อย ซึ่งงานวิจัยฉบับนี้ได้มีการทบทวนวรรณกรรมที่เกี่ยวข้องในเรื่องของโลจิสติกส์เพื่อสิ่งแวดล้อม การขนส่งสีเขียว การพัฒนาที่ยั่งยืนและพฤติกรรมการซื้อขององค์กร เพื่อนำมาเป็นแนวทางในกรณีศึกษาเชิงคุณภาพนี้ ทั้งนี้ผู้ใช้บริการขนส่งได้ให้ความร่วมมือในการสัมภาษณ์เพื่อเก็บข้อมูลจำนวนทั้งสิ้น 20 รายโดยมีเกณฑ์ในการคัดเลือกจากประสบการณ์ทำงานในอุตสาหกรรมการขนส่งอย่างน้อย 5 ปี และผู้ใช้บริการขนส่งเหล่านี้จะต้องเป็นผู้ที่มีอำนาจในการตัดสินใจเลือกผู้ให้บริการขนส่ง จากผลการวิจัยแสดงให้เห็นว่าวิธีการขนส่งสีเขียวนั้นไม่มีผลต่อการตัดสินใจใช้บริการของผู้ใช้บริการขนส่งสินค้า ซึ่งส่งผลให้บริษัทขนส่งส่วนใหญ่ไม่ได้ให้ความสำคัญที่จะนำการขนส่งขนส่งสีเขียวนั้นมาปฏิบัติใช้ นอกจากนี้ผลการวิจัยนี้ยังนำเสนอมุมมองของคนไทยที่มีต่อการขนส่งสีเขียวพร้อมทั้งแนะนำแนวทางในการขนส่งเพื่อลดผลกระทบที่เกิดขึ้นต่อสิ่งแวดล้อมอีกด้วย

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Abstract

This research aims to explore the perceptions about green transportation, its challenges and opportunities and its influence toward buying behaviours from the perspectives of transportation service customers in Southern Thailand. While the research on the green transportation is continually increasing, there are still a few studies on the green transportation particularly in the South of Thailand. To progress the study, the literature on green logistics, green transportation, sustainable development and business buying behavior were adopted. The qualitative case study was implemented. Data saturation was reached when interviewing twenty transportation service customers. The criteria for selecting these samples were based on at least five year of their working experiences in transportation industry and these samples must be the people who have authorities to select transportation services providers. The results showed that the green implementation does not have any effect in the transportation service customers' buying decision. As a consequence, most of the transportation companies rarely apply the green policy. The study offers a Thai perspective towards the green transportation and its practice adding to the literature and provides suggestions to the green transportation approach.

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Prapatsara Anantapokai

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List of Abbreviations

LPI	=	Logistics Performance Index
AEC	=	ASEAN Economic Community
TGO	=	Thailand Greenhouse Gas Management Organization
ASLT	=	Association of Southern Logistics and Transportation
ISO	=	International Standard Organization
CO2	=	Carbon Dioxide
N2O	=	Nitrous Oxide
NO2	=	Nitrogen Dioxide
dB	=	Decibels
RFID	=	Radio Frequency Identification
CNG	=	Compressed Natural Gas
LNG	=	Liquefied Natural Gas
ICT	=	Information and Communication Technology
CSR	=	Corporate Social Responsibility
GSCM	=	Green Supply Chain Management
ESCM	=	Environmental Supply Chain Management
TISI	=	Thai Industrial Standards Institute
B2B	=	Business-to-Business
GDP	=	Gross Domestic Product
TCIJ	=	Thai Civil Rights and Investigate Journalism
GMS	=	Greater Mekong Sub-Region
GA	=	General Average Cost
HR	=	Human Resource

Chapter I

Introduction

This chapter provides an introduction to the green strategy, especially on the environmental sustainability in transportation industry. The chapter then proposes the insights of problems and the purposes of the study. This is followed by the research questions.

Research Background

In these present days, the advanced technologies and industrialization drive the growth of logistics industry (Lieb & Lieb, 2010). Basically, logistics has been an essential determinant in business performances, and it is necessary for the economic development as well as the society's prosperity (McKinnon, 2010). According to the Council of Supply Chain Management Professionals (CSCMP) (2007, p. 293) logistics can be defined as *"the part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the points of origin to the points of consumption in order to meet customer's needs and requirements"*. Therefore, this can be concluded that supply chain management includes all of the logistics management activities which are coordinated with the flow of goods from sellers to customers' hands. Moreover, logistics function is an integrating operation which involves various related activities such as sourcing, producing, scheduling, packaging marketing, manufacturing, warehousing, transporting, information technology, and customer services (CSCMP, 2007). Logistics is significant in various areas of industrialization which transportation plays a key role in logistics activities. Transportation is not just conveying the goods from one location to another but it means to provide the delivery services that satisfy customers' needs (Mammo, 2010). Transportation is necessary in the operation of logistics which joints the processes of

production and distribution of goods through management techniques and good coordination (Sreenivas & Srinivas, n.d.).

Additionally, transportation is the major sector of logistics activities which has negative impacts on the environment (Ribeiro, Kobayashi, Beuthe, Gasca, Greene, Lee, Muromachi, Newton, Plotkin, Sperling, Wit and Zhou, 2007). Transportation activities account for approximately 21 percent of total carbon dioxide emissions on a worldwide basis, especially land-based transportation that produces higher emission rates than any other sectors do (The World Trade Economic Forum, 2009; The World Bank, 2016). Moreover, transportation by trucks accounts for 57 percent of global freight emissions (Hunt, 2017). These emissions involve burned fossil fuels which come from petroleum-based fuels, largely gasoline and diesel (IPCC, 2014). As the result, many environmental problems have been occurred such as air pollution, water pollution, noise pollution, deforestation, and global warming (Tseng, Yue, & Taylor, 2005). Thus, these problems can turn to be cumulative effects which related to people's health, agricultural products and instability of climate changes (Logistics Cluster, 2013). Chittyal, Dargopa til, and Bhogade (2013) pointed out that this was the turning point of where the world started to suffer heavily from transportation growth and expansion. Hence, many companies need to become increasingly aware of environmental issues and be more concern on the sustainability (Ribeiro *et al.*, 2007).

However, the distinct solution to these environmental issues is greening transportation sector to be more environmentally friendly which has no negative impact on the environment and this leads to green transportation (Rinkesh, 2016). There are many ways to implement green transportation such as renewable energy, route optimization, information technology (e-custom) and eco-driving behavior (Halonen, 2016). As follows, green transportation can be applied to reduce the environmental impacts from transportation activities to achieve cleaner environment (Rodrigues, Bowersox, & Calantone, 2005). Therefore, green practices become the important parts of the modern company agendas in an international level due to impacts from society's environmental awareness and social responsibilities (Murphy & Poist, 2003). Many countries have started to put forward restrictions on import and

export related to environmental subjects. Since global competition has been increasing and must be placed high on a company's strategy, many large enterprises required the improved environmental performances throughout their supply chain (Boonyachai, 2013). The companies have to revise their strategies to be more sustainable (Markley & Davis, 2007). Also, government regulations and international standards heavily support the environmental practices (Murphy & Poist, 2003). For the government sector, environmental regulations are launched instantly in many countries. On the side of transportation service providers, the consciousness has been continually increasing (Srisorn, 2013). The global trading system has become liberalized, and then adopted green practices have become increasingly integrated in all business agendas (Goransson & Gustafsson, 2014).

Interestingly, people in many countries are more open and responsive to development of sustainability through green transportation as same as in Thailand, people seem to be more aware of green solutions but there are some barriers for the development of environmental protection such as capacity barriers, financial barriers, lack of regulatory instruments and supports (Tangpaisalkit, 2009). However, the level of greenness would imply different results among different people (Björklund, 2011). It can be explained that the general public does not perceive all green logistics activities as equal. There are different results in different green activities (Hazen, Cegielski, & Hanna, 2011). Importantly, the understanding and co-operation between transport service providers and transport service customers is the key to drive effective green practices (Björklund, 2011).

All in all, the growth of logistics industry is being driven by advanced technologies and industrialization. Transportation is one of the most important in logistics process which help to connect the methods of production and distribution of goods together. Unfortunately, environment is getting dirty day by day as the results from emissions polluted by transportation sector. Therefore, the way to solve these environmental problems is green transportation. Anyway, the problem statement for conducting research is explained in the next part.

Problem Statement

The role of logistics plays the important factor in operations of businesses in many industries (Goransson & Gustafsson, 2014). Transportation is a part of logistics which is crucial in the manipulation of logistics management. Transportation system is a key element in logistics chains which joints with the separated activities and highly influences the performances of logistics operations. One-third of overall logistics cost is transportation cost (Xia & Wang, 2013). To maximize the benefits, a well operation between each component in a transport system is needed. On the other hand, one of the biggest pollution makers in logistics process is transportation especially road transportation which its emissions have increasing at a higher rate every year (Simatupang & Sridharan, 2005). In addition, transportation is a major contributor in climate change, green house effect and pollutions. Effects of a poor transportation system could lead to high value of cost, time consuming, and endangering the environment (Tseng, Yue, & Taylor, 2005).

McKinnon, Browne, and Whiteing (2015) indicated that as business are increasingly pressured to adopt more sustainable practices, reducing environmental impacts of transportation is one topic that gains ever-greater attention. At an international level, an area of green transportation is expansive and growing in scopes. Green transportation is an interesting topic that many countries have paid attention to and used as a non-tariff barrier against countries without applying green (McKinnon *et al*., 2015). For this reason, green efforts and ambitions from transportation service providers continue increasing. They try to adapt greenness in their own appearances and more focus on sustainability. According to Satheya, Li, Horvath and Madanat (2006), they supported that green transportation can enhance positive image of organizations and solve some environmental problems such as climate change, global warming and greenhouse effects. Green practices could enable the economy to be grown sustainably, and in the meantime help to tackle the environmental problems (Deng & Hang, 2012). Importantly, good transportation management must be paid attention in a dimension of the safety, and responsibility to the public must be shown. Moreover, social enthusiasm about going green is also needed because this force can

push the business owners to adjust themselves to be green in order to respond to customers' requirements and market demands (Adsavakulchai, 2009).

Logistics sector is a big industry in Thailand which generated high value of revenue. Share of transportation cost is counted as the largest cost in Thailand's overall logistics cost (Rujopakarn & Taneerananon, 20091T). In 2016, Thailand Logistics Performance Index Rank was at the number 45 out of 160 countries, which logistics performance index overall score was 3.26, and 3.14 stands for logistics competence (World Bank, 2016). Thailand's strategic transport plan for the year 2011-2020 has been developed by Thailand Ministry of Transportation which the objective is to set up Thailand to be a hub of trans-regional connectivity. Logistics in Thailand is very popular which better provide the best location when compared to other countries in Southeast Asia (Vinayak, Thompson, & Tonby, 2014). The introduction of ASEAN Economic Community (AEC) in 2015 has offering great opportunities for 10 ASEAN member states (Kotler, Kartajaya & Huan, 2007). The opening of AEC has stimulated the growth of logistics and transportation in Southern Thailand because road networks were strengthened across countries (Sehlleier & Haas, 2016). Consequently, the demands for transportation services can be increased as goods and services could be more freely transferred. Also, the reduction in tariff can increase border trade and transit trade, the expansion of production base, including overall investment into other ASEAN countries (Solidiance, 2014). As a result, road is stills popular and used as the major mode of freight transportation so the demands for trucks and other commercial vehicles will continue to increase (Sehlleier & Haas, 2016).

Unfortunately, many companies in Thailand sometimes struggle to keep up with new sustainability-focused transportation standards and regulations as well as developing and implementing eco-conscious practices which is still elusive to them (McKinnon *et al*., 2015). Moreover, there are some issues about sustainability and environmental transportation in Thailand that obstruct the development and need to improve quickly. For a modal shift, existing railway network must be improved. The complete integration of railways and waterways with road transport or multimodal

transport must be developed (Hanaoka & Regmi, 2013). Freight movements in most modes of transportation are significantly dependent on diesel fuel which is a finite resource and expensive (Russell, Coyle, Ruamsook & Thomchick, 2014). Especially, heavy-duty diesel-engine trucks are one of the highest costs among other modes of transportation. Previously, there are few transportation laws in terms of environmental protection in Thailand so they still lack of sufficient emphasis on environmental standards while many countries have already introduced laws to promote their environmentally friendly concept. Therefore, most of businesses are putted a new face on environmental concern (Simatupang & Sridharan, 2005). Moreover, Thailand Greenhouse Gas Management Organization (TGO) was established in 2007 by Ministry of Natural Resources and Environment. This governmental organization is responsible for reducing greenhouse gases in Thailand in order to increase capabilities and competitiveness through sustainable development for private and relevant sectors. Thailand Greenhouse Gas Management Organization (TGO) is the collaboration center between government, private sector and among institutions to support social, economy and environmental conservation (Thailand Greenhouse Gas Management Organization, 2014). In developed countries such as Germany, USA, England and Japan, a green strategy had been already applied as the important subject in their corporate strategies (Xiu & Chen, 2012). In consequence, it is different from emerging countries where people are less interested in environmental issues so the desire to initiate green practices is quite low subsequently (Zongwei, 2011).

However, there are few researches about greening in Southern Thai markets, particularly in the field of green transportation. Transportation service providers in Thailand still lack of interest and motivation on the importance of green management because the drivers and influences to be green are not sufficient for them (Srisorn, 2013). In addition, transportation services customers seem to be satisfied with the services they have received. Actually, the shift in demands from customers will cause the change in supply from providers as well. Thus, if transport service customers become more aware of green value, the demand for green service will increase and this will stimulate the business functions to become greener in order to satisfy their customers' needs. It is still a controversial issue about how important a green strategy

is for transportation service provider in industry's competition that has violently increased. Importantly, transportation plans in Thailand should be developed to be competitive in global markets. As exporting is one of the important activities that help to increase Thai economic outputs, especially rubber and rubber woods. Moreover, most rubber is exported from the South of Thailand. Therefore, the awareness and influences of green strategy from transportation service customers' perceptions in the South of Thailand market was studied in this research, due to the fact that transportation service is one of the popular businesses in Southern Thailand where the markets are still widely open and competitive. Plus, since Southern boarders are connected to Malaysia and Myanmar, there are a lot of ports for export and import activities. Another objective of this study was to explore whether or not the influences from green transportation will affect decision making for choosing transportation service providers in the South of Thailand. In addition, the points of view and notions of going green from the transportation service customers could reflect the challenges and opportunities for green initiation in Thailand. However, transportation services providers and transportation service customers need to have better understanding about green strategy and sustainable development for future implementation.

Overall, it may be said that business sector has been under increased pressure in recent years to be responsible to the environmental problems especially the effects from transportation. Poor transportation systems adversely affect industrial competitiveness and raise the damages on the nature. Thailand has also been facing some trouble in terms of environmental issues which require urgent handling. Moreover, there is no research related to green transportation and environmental problems in the South of Thailand so this study is conducted. Next, proposes of the study and research questions are clarified as follows.

Purpose of the Study

The research aimed to study the awareness and influences of green transportation and understand the contemporary practices of Thai transportation service providers in improving green performance through the perceptions of transportation services' customers (manufacturers and exporters) in the South of Thailand.

1) To explore the perceptions and understanding about green transportation from the perspectives of transportation services' customers in the South of Thailand.

2) To study the challenges and opportunities of green transportation in Thai industry.

3) To investigate whether or not green transportation has influences on transportation service customers' buying decisions.

Research Questions

According to the purposes of the study, the research questions were designed to investigate the current situation and find out the answers of this study. Thus, the following research questions were addressed in the study:

1) How do transportation services' customers in the South of Thailand perceive in green transportation?

2) What are the challenges and opportunities to apply green transportation in Thailand?

3) How do green transportation have any influences on transportation service customers' buying behavior?

This chapter clarified the background and problems of the research regarding transportation and environmental issues as well as provided purposes of the study. Also, research questions were mentioned in this chapter. Several literature reviews which are related in this research were described in the next chapter.

Chapter II

Literature Review

In this chapter, the previous theoretical review for this thesis is presented. This chapter consists of eight parts as follows.

2.1 Related Definitions on Transportation Activities
2.2 Environmental Impacts from Transportation
2.3 Green Logistics
2.4 Green Transportation
2.5 Sustainable Development Concept
2.6 Environmental Standards
2.7 Business Buyers' Behavior
2.8 Research Gap

2.1 Definitions

2.1.1 Logistics

According to Coyle, Novak, Gibson and Bardi (2010) stated that logistics is about getting the right product, to the right customer, in the right quantity, in the right condition, at the right place, at the right time, and at the right cost. These seven R's rule has linked the elements of customer services and added relative value to the products and services (Mangan & Hannigan, 2000). Logistics activities comprise of freight transport, storage, inventory management, material handling and all related information processing. Various logistics tasks are operated under logistics department (Robinson, 2013). Similarly, logistics refers to the activities of planning, execution, and others related supporting activities and also controls the movement of goods or people in order to achieve specific objectives (Gleissner & Femerling, 2013). In the same way, logistics management is a part of supply chain management that deals with efficient and effective management of goods and services for day-to-day

activity in order to meet customers' needs and requirements (Schönsleben, 2011). Moreover, logistics is value-added services which include information technology and consulting. Logistics goes beyond delivery which involves services such as supporting documentation, distribution center, warehousing, etc. (Robinson, 2013).

Therefore, logistics functions can be divided into four categories which are warehousing, transportation, customer service, and inventory and logistics management (Vaidyanathan, 2005).

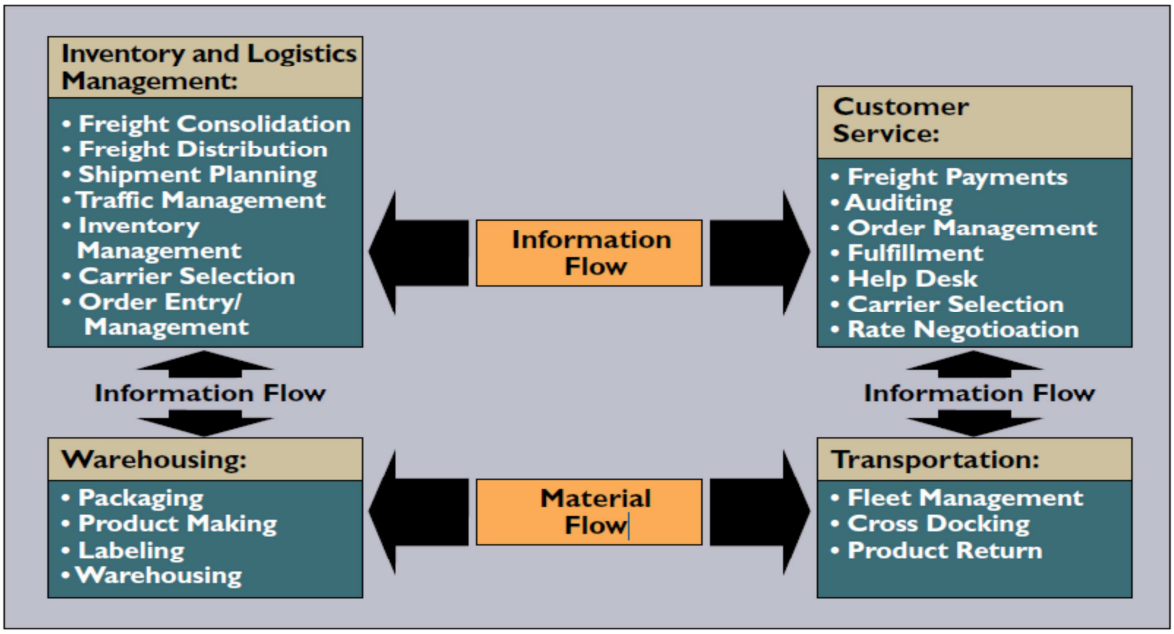

Figure2.1: Categorization of Logistics Functions (Vaidyanathan, 2005: 91).

Logistics providers provide conveniences, cost reduction and flexible logistics services to their customers by operating many complicated activities as listed below:

1) Warehousing

Vaidyanathan (2005) clarified that warehousing functions comprise of many activities such as receiving, sorting, bar coding printing, and packaging. There are a lot of activities that increase complexity of distribution process.

2) Transportation

A freight carrier has a duty to move goods by land, sea, rail, and air in a timely and efficient manner. Presently, there are numerous complexities of transportation, namely increasing of freight rates, fuel costs, service tracking and enhancing technology, scheduling, insurance cost, and safety compliance. Thereby, the cost and services pressure increase on companies. Transportation service providers can help to solve these problems in an effective way. They could provide better managing growth, changing strategic management, negotiating for lower freight rates, etc. to meet customers' requirements.

3) Customer services

There are a variety of customer services such as carrier selection, rate negotiation, auditing, financial services, warranty parts recovery, international trade management, etc. Customer services offer quicker and reliable delivery to increase customers' satisfaction.

4) Inventory management and logistics

Inventory services include global inventory visibility, order entry management, forecasting, shipment management, custom inbound and outbound documentation, etc. It is important to minimize cost of holding inventory with proper inventory assortment to increase sales and customers' satisfaction (Bowersox & Closs, 1996).

Therefore, all activities are linked with information flow that can contribute to collaboration within an organization. Rushton, Oxley and Croucher (2000) stated that information is the lifeblood of a logistics and distribution system that will help the system to function adequately and productively.

2.1.2 Road Transportation

In this study, road transportation is mainly focusing on trucks. Road is a route or way on land between two places to allow travel by foot and means of transport such as vehicles, car, trucks, etc. (The Economic Times, 2017). In fact, road transportation affects the environment negatively as vehicles pollute a lot of emissions such as nitrogen dioxide, volatile organic compounds, carbon monoxide, and various harmful air pollutants, including benzene, which have an adverse respiratory health effects and a serious threat to global warming (Boundless, 2016).

2.1.3 Rail Transportation

Rail transportation or train transport is a means of transportation which run on tracks or railroads. Rail transportation can carry high amounts of quantity over long and short distances with more secure due to its fixed routes and schedule (The Economic Times, 2017). Moreover, this is an effective mode of transportation in order to reduce environmental impacts as train transportation pollutes least pollutions to the environment. However, trains need high cost of construction and maintenances and can’t provide door-to-door services. In this study, rail transportation refers to transfer goods or products (Rodrigue, 2017).

2.14 Water Transportation

For this study, water transport means the process of cargo transportation over the sea and ocean by ships or vessels. This is less costly than air transport for trans-continental shipping which can convey large quantities of goods. Moreover, this is the largest carrier of freight in the world (The Economic Times, 2017).

2.1.5 Transportation Service Provider

Transportation service provider is a company specializing in arranging transport services of merchandise on behalf of its customers. A company could arrange transportation with one or more carriers for transportation to a consignee. For international shipping, a transportation service provider usually compiles cargo or

goods from many shippers to get lower price rate with large amount from carriers through the collective agreement (Universal cargo, 2016). It usually provides services including tracking inland transportation with safety and in time delivery. Good transportation service provider can save time and potential problems while providing reliable transportation of products at competitive rates (Rau, 2016).

2.1.6 Transportation Service Customer

Transportation service customer is a company that received transport service from transportation service provider in order to transfer their products to the end customers under a negotiated contract. In this research, the transportation service customers refer to manufacturers and exporters which relied on truck transportation as their main transportation mode.

2.1.7 Manufacturer

Manufacturer refers to people or commercial business using components, parts or raw materials to convert into finished goods sold directly to consumers or other manufacturing businesses. These products are intended to meet customers' demands and expectations. Mostly, manufacturing companies are structured with the division of labor and task specialization to produce the large scale of production of standardized products (The Law Dictionary, n.d.). Therefore, manufacturing business will be simple or complicated depending on the parts required creating a finished product. However, there are environmental regulations that manufacturers have to handle (Hill, n.d.).

2.1.8 Exporter

Exporter is a person or a company that has authority of a principal party in interest to determine and control sending items out of own countries. Export is the activity for international trade which transfers goods from one country to other countries (Amadeo, 2017). It is one of the oldest forms of economic transfer between nations that have the restrictions such as tariffs or subsidies. Therefore, an export function help an economy to grow, foster international trade, stimulate domestic

economy, as well as increase sales and profits by expanding into new markets. Nevertheless, there are some challenges in exporting such as extra costs in allocating considerable resources into researching foreign markets and modifying products to meet local demands and regulations (Investopedia, n.d.).

2.1.9 Outsourcing

Outsourcing has been increasingly growing as a result from increasing global competition, rising customer expectations and application of marketing orientation (McKinnon, 1999). Outsourcing refers to researching for new suppliers and the ways to acquire products and services that are external to an organization which allows companies to concentrate on their core competencies as well as reduce cost and gain competitive advantages (Lankford & Parsa, 1999). Companies can't be expert in every facet of their businesses, so outsourcing is away to solve this matter. Companies can also outsource third party logistics providers in order to manage the flow of material as well as to reach cost efficiency. Manufacturing firms and exporters now realized that outsourcing and find logistics partners are potential strategies for their companies' advantages (Gourdin, 2001). A global research by Langley, Allen and Dale (2004) was summarized that specific logistics service outsourced by customers and frequent usage of each activity were conducted over four global regions in 2004. The results showed that warehousing and transportation are the most frequently outsourced activities to third part logistics providers. Therefore, many companies would like to outsource in the areas of logistics and transportation (Jaafar & Rafiq, 2005).

An idea of specialization is one of the important drivers for outsourcing because customers would like to obtain the specialized skills from logistics and transportation providers in order to obtain cost advantages through economies of scale (Bowersox & Closs, 1996). The excessive overhead costs and labor costs in logistics function resulting from inappropriate allocation in resources can be reduced by outsourcing. For this reason, cost reduction comes from the economies of scale when large volume of services offers to multiple customers (Greaver, 1999). Moreover, outsourcing provides a variety of flexibilities to customers such as flexibility in

fluctuated demands, flexibility in advanced technology, flexibility in service offerings, flexibility in resources and geographic locations (Christopher, 2000).

There are different types of levels of outsourcing transportation services clarified by Robinson (2014) as listed below:

1) Tactical Outsourcing

This outsourcing level is a long-termed basis with negotiated contacts and integrated IT systems to facilitate free information flow and create supply chain visibility.

2) Strategic Outsourcing

Transportation service providers will become partners in supply chain management and establish transactional transparency.

3) Transactional Outsourcing

This level of outsourcing is usually focused on cost, and usually for making a one-time shipment.

2.1.10 Green Logistics

Green logistics is a management way to prevent damages from logistics processes on environment and realize purification of logistics environment to use full of logistics resources (Srisorn, 2013). In the same way, Rodrigue, Slack and Comtois (2001) also defined that green logistics is an environmentally friendly transport and distribution system which its practices and approaches are used to reduce the environmental problems involving material handling, waste management, packaging, and transport. Moreover, the common perception of green logistics is emphasized on environmental sustainability and practices used to decrease costs as well as environmental impacts of a logistics chain while keeping economic, environmental and social aspects in mind (Sbini & Eglese, 2007). The concept of applying green

logistics is to adjust the whole system, so, entrepreneurs have to consider every step thoroughly (Rodrigue *et al.*, 2001).

2.1.11 Green Transportation

Green transportation is a kind of transportation practices or vehicles, which is eco-friendly and follows the rules of going green. Green transport or sustainable transportation system can make sustainable positive contribution to environment, economy and society. Going green concept does not provide any negative impacts on environment, but advantages for business (Rinkesh, 2009). According to Halonen (2016), green transportation involves effective and efficient resource utilization, changes in transportation structure and making healthier travel choices. Renewable energy resources such as solar, biofuels, and wind electricity can be used to enhance sustainable transportation. There are many benefits from using a green mode of transportation. For example, emissions will be decreased; quality of human life will be improved; more sustainable economic development will be built; lesser fuel will be consumed (Halonen, 2016).

2.2 Environmental Impacts from Transportation

There is a conflict between the issue of transportation and the environment since transportation provides socioeconomic benefits, but these activities also affect environmental system negatively. Impacts from transportation fall into three categories: direct impacts, indirect impacts, and cumulative impacts. Direct impacts are immediate consequences on environment such as noise and carbon monoxide emissions. For indirect impacts, there are often higher consequences than direct impacts such as outcomes of incomplete combustion in engine affecting respiratory problems. Cumulative impacts are additives and multiplication of transportation activities such as climate change, global warming and scarcity of natural resources (Rodrigue, Bowersox & Calantone, 2005). Moreover, the most important environmental impacts are presented below.

2.2.1 Climate change

Activities of transportation release high rate of emissions and gases into the atmosphere such as carbon monoxide (CO), carbon dioxide (CO2), nitrous oxide (N2O), benzene and heavy metals (zinc, copper and cadmium) (Rodrigue, Bowersox & Calantone, 2005).

2.2.2 Air quality

Transportation is a source of pollution in the form of gas influencing on the quality of air and damaging human health, for example, cancers and respiratory diseases. When people inhale carbon monoxide (CO) and nitrogen dioxide (NO2), these gases reduce the availability of oxygen and lung functions. Moreover, smog could reduce the visibility and affect the quality of life (Rodrigue, Bowersox & Calantone, 2005).

2.2.3 Noise

This type of impacts will affect both people and animal life. Noise is an undesirable sound which above 75 decibels (dB) will seriously affect human physical and psychological wellbeing. However, in the urban areas, ambient noise is a result from road transportation (Rodrigue, Bowersox & Calantone, 2005).

2.2.4 Water quality

Fuel, chemicals and other substances discarded from vehicles or terminal operations such as airports can contaminate hydrographic systems. For marine transport, the quality of water will change in a negative way due to waste, dredging, and oil spills. Waste usually contains bacteria, plastic, and metals that can cause serious environmental problems on water, as well as it takes long periods of time to disintegrate (Rodrigue, Bowersox & Calantone, 2005).

2.2.5 Soil quality

Soil erosion and soil contamination are environmental impacts of transportation from coastal transport facilities, port and airport developments. These

activities can impact on the loss of fertile land and the low quality of soil (Rodrigue, Bowersox & Calantone, 2005).

2.2.6 Biodiversity

Deforestation influences on biodiversity because many routes have required draining land, reducing wetland areas, and driving out water plant species. Many animal species are endangered as the result from changes in their habitats. Therefore, the scales of impacts from transport activities are different, depending on geographical scales ranging from local to global levels. Rodrigue, Bowersox and Calantone (2005) explained that transport networks, modes and traffic levels are the main factors of environmental impacts. Networks influence on spatial distribution of emissions, while modes relate to the nature of emissions, and traffic is about the intensity of emissions. Currently, societies increase awareness for environmental issues, which the activities involved in logistics services are parts of causes negatively affected environment (Goldsby & Stank, 2000). In details, there are a growing scale of climate change problem, global warming, greenhouse effects and pollutions, so providing companies need to understand how to measure and apply the emission control policy for their road fleet and operations (McKinnon, 2008).

People are aware of negative impacts on environment such as pollution of air and water, massive disposal of waste and decreasing in natural resources. Environmental responsibility, one of the important issues businesses have faced and requested lesser impacts on environment, is mentioned in the general public (Murphy, Poist & Braunschweig, 1996). In fact, there is a connection between overall transport operations and environmentally responsible transportation (Goldsby & Stank, 2000). Companies should develop good assessments and communicate well with their clients to get the right signals when it comes to products or service development. It can be seen that in a small company, there was less presence about environmental responsibility than there was in a big one (Murphy *et al.*, 1996). Actually, there are several ways in order to show their responsibilities on environment and also minimize negative impacts of their activities. Beyond, environmentalism is nowadays an important characteristic forcing the economy and businesses.

2.3 Green Logistics

Environment should be taken into consideration primarily in the logistics development. Logistics in the perspective of environment is a new trend of logistics management which can protect the environment from logistics' damages by full using of logistics resources (Rodrigue *et al.,* 2001). Green logistics is also related to the best combination between ecology and environment under the conditions of ecological balance, reasonable economy, advanced technology and ethics of social responsibility and obligation (Sbini & Eglese, 2007). Therefore, green logistics system comprises of many components which are green warehousing, green packaging, green transportation, waste management, and green logistics data collection and management.

2.3.1 Green Warehousing

Cross-docking is a way for going green in warehousing which means that goods are directly transported from stores to wholesalers and retailers without any stocks in their warehouses. Therefore, warehouse management can decrease some operating costs and reduce environmental problems (Wu & Dunn, 1995).

2.3.2 Green Packaging

Better packaging of products can reduce material using, increasing space utilization, reducing the amount of handling required and waste, and fewer fleets required (Wu & Dunn, 1995).

2.3.3 Green Transportation

Green transportation practices can help companies to save cost and reduce environmental impacts from logistics operations, for example, modal choices, freight consolidation, clean vehicles, fuel efficiency, etc. (Thiell, 2011).

2.3.4 Waste Management

Companies have to measures waste management because it provides benefits to the companies to turn their waste into valuable resources (Defra, 2007).

2.3.5 Green Logistics Data Collection and Management

Data collection and management in green logistics can optimize management of resources, reduce fuel uses, and increase profits such as radio frequency identification (RFID) and fuel consumption monitoring.

2.4 Green Transportation

Green transportation is one of the main constituent of green logistics. Transportation is one of logistics activities that have negative influences on the environment. There are three sources of transportation impacting on the environment: the construction of transport infrastructures, the operation of transport vehicles and the wastes from transportation vehicles (Wu and Dunn, 1995). Many problems arise from these three main sources. Plus, roads, airports, harbors and rails are often filled up, and many landfills are polluted with disassembled vehicles and parts. Moreover, 88% of Carbon dioxide emissions (CO2) are from road transportation which represents the third largest source of greenhouse emissions (Tiwari, Cervero & Schipper, 2011). Hence, in order to solve these problems, four general strategies are needed to use, substitute, clean up the outputs, and turn outputs into inputs (Thiell, Zuluaga, Montanez & Hoof, 2011).

The activities presented below have effects on road transportation industry and the ways to become greener for logistics activities. These activities can help to decrease carbon footprint, reduce cost and save the environment (Martinsen & Huge-Brodin, 2011).

2.4.1 Modal Choice

Companies can decrease transportation cost and reduce CO2 emission by using multimodal transport to deliver their goods. In fact, transport by railways is better than transport by roads in terms of pollution and cost problems. Using

multimodal transport to deliver goods and services can help companies to reduce CO2 emissions and pollutions (Rondinelli & Berry, 2000). In fact, rail freight transport is the most preferred mode of transport for environmentally sound transportation processes, but it takes longer time than road transportation. As a result, road transportation is still popular and frequently used among modes of transportation (Thiell *et al.,* 2011).

2.4.2 Freight Consolidation

Distribution center helps companies to incorporate operations with their suppliers. In distribution center, products will be classified and organized, and then distributed to various stores in order to reduce a number of trips and trucks.

2.4.3 Clean Vehicle / Fuel Efficiency

Companies have to ensure cleanliness and potential of vehicles. Fuel efficiency can be improved by selecting alternative fuels, eco-driving techniques, and proper maintenance programs. More efficient and eco-friendly fuels are also important keys in order to increase greenness of transportation (Martinsen & Huge-Brodin, 2011). Trucks can run better with longer periods, and cost of transportation can be decreased (Thiell *et al.,* 2011). According to the study of Wu and Dunn (1995), several alternative fuels were classified for safe and clean purposes which are more accessible than diesel, for example, compressed natural gas (CNG) and liquefied natural gas (LNG). These natural gases are 40 percent cheaper than petrol. Also, maintaining vehicles in safe and efficient working condition can improve fuel efficiency, prolong vehicle lifetime, and reduce accident rates (Wu & Dunn, 1995). In addition, companies need to ensure that the fluids such as oil and gas would not leak out from the vehicles which could save the operating costs and reduce the amount of environmental damages. Therefore, proper maintenance program is required to ensure a safe and efficient working condition, as well as vehicle life will be extended and accident rates will be decreased (Thiell *et al.,* 2011).

2.4.4 Efficient Driving Behaviors

In order to increase fuel efficiency, driving behavior must be changed to be more eco-driving. Eco-driving is a driving behavior that can save fuel consumption up to twenty five per cent. Tracking system has also taken to inform the excess or unnecessary vehicle usage, control the speed of vehicles and fuel wastage of drivers (Janota, Dado, & Spalek, 2010). Eco-driving is a technique that is also emphasized on smoother driving behavior which can reduce fuel consumption and carbon emissions in vehicles. The study found that the drivers of fully sixty eight tons trucks can reduce their fuel consumption by twenty seven percent because of eco-driving techniques (Shaheen & Lipman, 2007). Interestingly, skipping gears when changing up, changing gears at lower engine revolutions, speed reduction, anticipating traffic flow, breaking less forcefully and less often are the techniques for sustainable and environmental-friendly driving behavior (Schulte, 2012). However, one percent of reduction in fuel consumption can save about $15,000 per annum for a company, and also help to reduce CO2 emission by about forty tons (Miller & de Matta, 2008).

2.4.5 Reuse of Pallets and Containers

Evaluation and reconditioning of pallets and containers are important because these can reduce contamination. Plastic can be used instead of wood pallets to reduce waste and protect natural resources. Alike, reusing pallets and containers can reduce wastes and protect natural resources from depletion. In order to reduce deforestation, companies have to apply recycle plastic instead of wood pallets and reconditioning of pallets and containers. Moreover, introducing a systematic program of evaluation is necessary to ensure efficiency and effectiveness of business strategies (Xia & Wang, 2013).

2.4.6 Route Optimization

Route optimization is a method to find the most efficient routing for transportation in order to minimize the amount of voyages, the transport time as well as the numbers of vehicles being used (Kontovas, 2014). Transportation companies should utilize fewer shipments for less handling, use more direct routes for shorter

movements and better space utilization. Thus, route optimization approach can save transportation cost due to the less usage of vehicles and reduction of distances for transportation (Wu & Dunn, 1995). Moreover, Sbini and Eglese (2010) said that route optimization is occurred when the vehicles are travelled out from congestions which mean choosing faster and more efficient routes.

2.4.7 Standardization of Truck Size

Companies can plan and optimize freight transport by standardization of truck sizes.

2.4.8 Measuring Carbon Emission

Wolf and Seuring (2010) presented that the transportation activities pollute high amount of CO2 emissions. Many companies learn how to measure and manage carbon emissions from their operations to become more efficient and productive companies (Piecyk & McKinnon, 2010). Measuring carbon emission is a process assisting to monitor environmental impacts. Also, ISO 14001 (Environmental International Standards) provides the guidelines and standards that measure and monitor the environmental performance for each company (Mollenkopf, Stolze, & Tate, 2010).

2.4.9 Innovation and adoption of Information and Communication Technology (ICTs)

Information and Communication Technologies (ICTs) is important tools and applications in mitigating environmental impacts from transportation activities (Zailani, Amran, & Jumadi, 2011). For examples, computerized routing, scheduling and vehicle telematics can lead companies to decrease pollutions as well as save fuels (Baumgartner, Leonardi & Krusch, 2008). Moreover, efficient real time feedback of driver behavior can be obtained through a method of Information and Communication Technologies (ICTs). Apart from that, infrastructure intelligence can be applied to reduce a number or duration of congestions and traffic in order to save time as well as reduce fuel consumption (Janota, Dado & Spalek, 2010).

2.5 Sustainable Development Concept

The concept of sustainable development developed from the ideas about sustainable forest management in order to impede the exploitation of natural resources in Europe during seventeenth and eighteenth centuries. Then, several publications from many authors such as Rachel Carson, Kenneth, Dennis and Donella were used the concept of sustainable to link the relationship between economic growth and environment (Stoddart, 2011). Besides, in 1987, the United Nations World Commission on Environment and Development launched Brundtland Report called 'Our Common Future' which included the definition of sustainable development that widely recognized in these present days (Brodhag & Taliere, 2006).

Therefore, green transportation is strongly interrelated with the concept of sustainable development which is mentioned on global, regional and national levels (Mckinnon *et al.,* 2010). Sustainable development means to satisfy modern requirements and not to damage the ability of future generations to meet their own needs involving the current needs, welfares and well-being of future generations. Needs and limitations are the key concepts that concern about irreplaceable natural resources, environmental and social footprints from economic activities (WCED, 1987; Shrivastava, 1995; Kuhlman & Farrington, 2010). Sustainable development is emphasized on an integration being developed in a manner that benefits all sectors of the economy (Mckinnon *et al.,* 2010).

There are some basic principles beginning with the inclusion of environmental protection. It is suggested in these principles that the environmental concerns should be put into the policy and regulations at national and international levels. Next, the inclusion of social aspects means that all members in the society should have the same opportunities and integrate in decision making process of society (Bajdor, 2012). Then, the inclusion of economic issues are explained that the natural resources, especially non-renewable resources, must be utilized in efficient and effective ways in order to develop sustainability (Modrak, Man & Dima, 2011). Thus, the development will be sustainable when environmental, social and economic aspects are combined together (Pazirandeh & Jafari, 2013). Moreover, economic and environmental issues are often intertwined; for example, increasing disposal costs

make waste reduction more economical, and new market opportunities come from environmentally conscious customers (Fleischmann *et al.*, 1997). In the meantime, a sustainable development theory is often associated with corporate social responsibility (CSR), green supply chain management (GSCM), and environmental supply chain management (ESCM) (Fleischmann *et al.*, 1997).

2.5.1 Triple Bottom Line

Triple Bottom Line is to ensure balance among social, economic and environmental aspects in order to contribute sustainability (Markley & Davis, 2007). The main objectives are to develop and implement the proper methods to reach the balance among the three components of Triple Bottom Line (Parson, 2013). There are a set of performance objectives from triple bottom line approaches: economy, environment, and society (Cherrett, Hickford, Maynard, 2007). Triple bottom line is a concept linked with sustainability by combining standard metrics of financial success with those that measure environmental stewardship and social justice. Nowadays, businesses pursuing sustainability are becoming more efficient, more innovative, more connected, more profitable, and more competitive (Coady *et al.*, 2010).

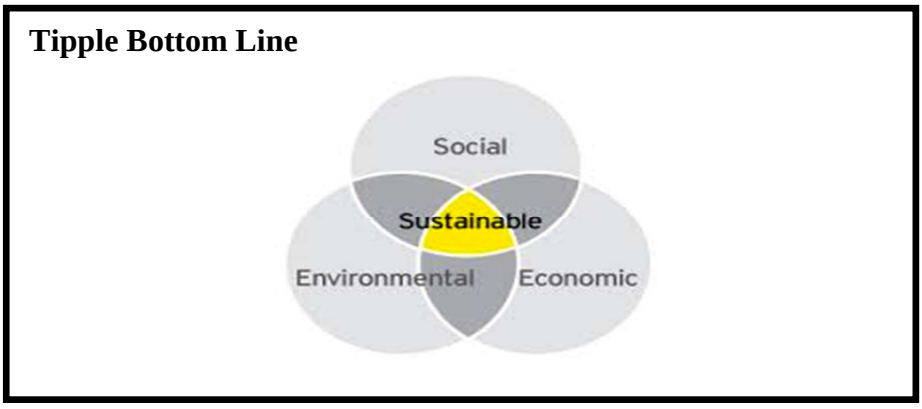

Figure 2.2: The Triple Bottom Line and Sustainability (Pakin *et al.*, 2003: 19).

This illustration presents a framework of sustainable development. As we can see, it is how the different factors work together in order to achieve sustainable development (Porter & Kramer, 2006). Reference to an efficient freight transport system, its objectives include minimizing congestion, making better use of transport infrastructure, minimizing pollution and reducing greenhouse gas emissions, managing development pressures on the landscape, as well as reducing noise and disturbance from freight movements. According to Agrawal, Singh and Murtaza (2015), due to the fact that the lower the ability to manage the environment, the lower common good delivered by the social system, and then the economic system can produce less output, environmental sustainability must be paramount. However, Giovanni and Vinzi (2012) argued that a decision about environmental friendliness may not be the most economical alternative in the short term, but it will be practical in the long run. Three components of Triple Bottom Line are presented below.

a.) Social Aspect

There are many factors being able to measure social impacts of companies, for instance, employees' and customers' satisfactions, labor practices, community impacts, human rights, and product responsibility (Markley & Davis, 2007). A sustainable company has to emphasize on the community and their workers when making decision in order to contribute toward the growth of society. Therefore, many customers are becoming aware of social implications of a company's performance. The social elements can control labor conditions to make sure that they are up to standards. The examples of labor conditions are fair wages, safe working environment and decent working hours (Giovanni & Vinzi, 2012). However, for transportation companies, a topic about driving hours is important and should be concentrated to balance the sufficient resting time of drivers (Savitz & Weber, 2006).

b.) Economical Aspect

An economical factor refers to the economic value and and profitability of a company. If the social and environmental issues are focused by the company, greater economic performance will arise subsequently (De Giovanni, 2012). In addition,

companies in logistics and transport industry can decrease their costs and improve economic performances by collaboration, reverse logistics, fuel efficiency, and route optimization (Savitz & Weber, 2006).

c.) Environmental Aspect

An environmental aspect in the Triple Bottom Line refers to company's environmental performance and its practices to reduce the negative impacts on environment (De Giovanni, 2012). The environmental issues were clearly noticeable and more problematic than other social problems. Also, environmental cost for transportation went up so quickly. Consequently, many companies have considered the long-term interest on their transportation decision to be more environmentally friendly (Murphy, 1996). Furthermore, transportation companies have started to focus on and launch green initiatives to create and develop sustainability which will be more profitable to companies in the long run (Savitz & Weber, 2006). As you can see, green transportation is a potential solution which helps companies to achieve their economic goals, while their carbon footprint is also reduced as well as satisfy their customers' needs (Hoek, 1999). Therefore, this is necessary to reach stability within Triple Bottom Line by starting from an organizational decision-making process (De Swardt, 2011).

In sum, the meaning of sustainable development widely used came from the Bruntland Commission Report. The report linked the issues of economic development and environmental stability. Also, sustainable development is related to green transportation which helps to balance between social, economical and environmental aspects. Green transportation is a potential solution which helps the companies to reach their economic targets while minimizing their environmental impacts as well as contribute the growth of society. However, to achieve the sustainability, the company needs a standard of references used to perform their environmental management system which explained in the next part.

2.6 Environmental Standards

Nebel, Quevedo, Jacobsen, and Helles (2005) stated that an environmental standard is a form of environmental regulations and development which a company can voluntarily choose to follow pre-defined processes and standards from a certification authority. The environmental standards can be separated into several types, for example, ambient standard which is the allowance of restricted emission rates in the ambient environment. Emission standard indicated the allowable maximum amount of pollutant release. Then, technology standard suggested the required technologies that need for polluters (World Bank Group, 1998). Many transportation companies applied Environmental Management Systems (EMS) into their operations in order to control their performances on environmental impacts (Nebel *et al.,* 2005). In fact, there are various standards that related to environmental management system such as Specification for Environmental Management Systems from British Standard Institute, Air Pollution Control Act from China, National Environmental Act from U.S., International Environmental Standard Organization, Emissions Standard and National Environment Quality Act from Thailand (Martin, and Kennedy, 2015).

However, this research particularly mentioned about ISO 14001 which is the environmental management standard that is recognized world-wide (Bagnoli, Holbrook, Miranda, Secunda and Tech, 2001). According to BSI (2015), ISO 14001 is an internationally agreed standard set out for requirements for an environmental management system which helps an organization to improve its environmental performances through more efficient use of resources and reduction of waste to gain competitive advantages and trust of its stakeholders. In fact, ISO does not perform certification itself, but it is one of standards that third-party certification firms provide to environmentally conscious companies to emphasize on their active environmental strategies (Bansal & Hunter, 2003). ISO 14001 is the first environmental management system standards designed to help an organization to focus on environment and drive continual improvement in its internal processes (Kuhre, 1995). Normally, most guaranteed companies certified as ISO 14001 are multinational corporations (Peglau,

2000). These companies must have their own environmental management systems, which is a set of processes, and practices enabling these companies to reduce environmental impacts and increase their operating efficiency (Corbett & Kirsh, 1999). There are many benefits from applying ISO 14001 which are to increase employees' engagement and existences, improve their reputation, covering provide competitive advantages and financial advantages and efficient strategic business aims (Clark, 1999).

Moreover, within International Standards Organization (ISO), there are many standards provided to manage environmental responsibilities. For example, ISO 14004 is related to an environmental management system. ISO 14010 and ISO 14012 are mentioned about audits of environmental issues. ISO 14015 is environmental assessment of sites and organizations, while ISO 14031 is the guidelines to evaluate environmental performances. The objective of setting environmental standards ISO 14001 is to gain worldwide standard acceptance and implementation for environmental processes (Peglau, 2000). Presently, there is improvement of ISO 14001 to a new version in the year of 2015. ISO 14001: 2015 is similar to the old version of ISO 14001: 2004; on the other hand, this new version standard will ensure that the management system is future-proof (Ciravegna Martins da Fonseca, 2015). In order to get the environmental certification, companies must pass the processes of assessment and audits on their environmental performances to assure their executions and commitments (Dunn, 1995). However, ISO 14001 is suitable for all types and sizes of organizations. It is required for organizations to consider all environment issues relevant to its operations (Clark, 1999). In Thailand, Thai Industrial Standards Institute (TISI) is one of departments under the Ministry of Industry that has authority to certify the national standards to qualified companies (TISI, 2000.).

2.7 Business Buyers' Behavior

2.7.1 The Natures of Business Market

Business-to-Business (B2B) market is huge and comprised of all organizations that buy goods and services for their production (Dwyer & Tanner, 2005). A business market is different from a consumer market in many aspects. Firstly, there are more decision participants and professional purchasing efforts, so their buying processes will be more formalized and take longer decision cycles. Secondly, buyers are fewer but larger and geographically concentrated. Thirdly, demand for Business-to-Business market (B2B) is inelastic and fluctuant as there are more complex buying decisions. Then, the relationship of buyers and sellers is stronger and works more closely together. Finally, most of business buying is relying on personal selling and strict to the predefined standards (Anderson & Narus, 2004).

2.7.2 The Demand for B2B Products

The demands for business products can be separated into two types which are derived demand and fluctuating demand. For derived demand, it is ultimately derived from the demand of consumer goods. If the demand of consumers is low, suppliers of a firm are in trouble. In consequence, industries must closely monitor the buying pattern of ultimate consumers (Rafay, 2015). Fluctuating demand is another type of B2B markets. Small changes in consumers' demand can cause a big effect throughout the chain of business, or a bullwhip effect will occur. Therefore, customers have a powerful purchasing force in the market (Anderson & Narus, 2004).

2.7.3 Participants in Buying Process

Purchase department is responsible for buying process which has to be followed by company rules and regulations. Marketing department also plays an important role in business buying process and involves in decision making process. Actually, each company has a primary list of approved vendors to choose as per requirements. Furthermore, requirements have been modified, and then purchase department has to look for other suppliers. A meeting and discussion between

departments could be arranged when new products or services are introduced. Importantly, a salesperson is needed for each transaction (Dwyer & Tanner, 2005). Moreover, participants in buying process can be many people in an organization and have a right to ask about the references of the products or services and prices. It can be concluded that buying process in business market is more complicated since many people are involved in the process (Balakrishnan & Cheng, 2005).

Decision-making unit of a buying organization is called 'buying center'. A buying center brings all members within an organization who influences on purchasing decisions. There are different members who comprised of those individuals and groups of professions (Tanner, Jr. & Raymond, 2010). These people will generally fall into the following groups. In the first place, users are those people or groups that actually use products or services. The second group is influencers. There are expert people who have experiences about products or services, as well as can define specifications and provide some information for evaluating alternatives (Balakrishnan & Cheng, 2005). The third one is buyers who have formal authority to select suppliers and arrange terms of purchase, as well as they have a good sense in shopping. The next group is gatekeepers or people who approve when a seller can meet and get access to members of a buying center. Gatekeepers have a certain amount of informal power and also control the flow of information. Then, deciders have formal or informal power to select, approve and make the final decision. However, interpersonal and personal factors among these people when making buying decision will all impact on the final decision (Anderson *et al.*, 2004).

2.7.4 Major Influencing Factors from Business Buyer

There are five major factors influencing on business buying behavior. First, economical factors such as prices and services can influence on customers' buying behavior (Anderson *et al.*, 2004). Second, organizational factors are important factors that can help to decide buying behavior. Each company will set their own objectives, policies and procedures before making their decisions, so it is necessary that sales people must understand how their companies organize. Therefore, different structures and systems of each company also have effects on business buying process (Dwyer &

Tanner, 2005). Third, there are many people from various departments with different cultures that are parts of buying decision; thus, personal factors of each participant will affect their buying behavior. Most companies prefer long relationships with their customers, thereby sales people have to know personal traits and emotions of each participant, and then try to learn and adjust themselves to specifically match their customers (Dwyer & Tanner, 2006). Fourth, environmental factors are about the demand for products, cost of money, economic outlook, technology, culture, resource availability, politics, and competitions. As societies are ever changing, business sectors have to adjust themselves to meet up with evolving changes. Finally, there are several interpersonal factors in buying decision such as motives, preferences and perceptions, as well as attitudes toward risks, ages, incomes and education. Moreover, other important factors affecting purchase are internal management, image, resources of a firm, customer demands and governmental intervention (Thakur, 2011).

Interestingly, customer loyalty is essential as it is a long-term commitment to repurchase involving favorable attitudes and a high level of customer satisfaction. Companies can establish loyalty through their logistics service capability counted as competitive advantages (Emerson & Grimm, 1996). Also, quality of employees or human resources must be also concerned to gain qualified people to interact with customers. Human resources are the most important factors that differentiate companies from competitions. Therefore, training is also significant in term of information and technology skills, communication skills and collaborative approaches to problem solving skills (Lieb & Randall, 1996). The right people with appropriate skills, motivation and willingness to work are necessary in a matter that can reduce errors of working, increase productivity and deliver quality of services (Trunick, 2006). In addition, there are five skills required for transportation companies which are an ability to plan and organize, an ability to learn quickly, an ability to think creatively, negotiation skills, and financial analysis. These skills are needful for managing the dynamics transportation operation (Gibson & Cook, 2001). Therefore, transportation service providers have to review their performances to compete in providing better quality services to their customers.

2.7.5 Business Buying Process

Eight important steps in business buying process are as follows:

Step 1: Problem Recognitions

A company identifies a need and realizes a problem which can be solved by acquiring products or services (Kurtz, 2009).

Step 2: General Need Descriptions

Members in a buying center will work together in order to make the best decision. They determine some required characteristics such as features and quantities needed (Dwyer *et al.*, 2006).

Step3: Specifications of Products

Influencers play important roles in order to specify what are needed for their desired products or services. A set of technical specifications of products obtained from step 2 are listed out (Kurtz, 2009).

Step 4: Search for Suppliers

A company is searching for qualified suppliers that can satisfy what they need by using online network, attending trade shows and conventions. Importantly, qualified suppliers must be reliable, financially stable, good reputations, and so on. In contrast, unqualified suppliers will be cut out from a list by purchasing department, and then try to find other suitable suppliers (Dwyer *et al.*, 2006).

Step5: Request for Proposal

Qualified suppliers are requested to submit their proposals. After evaluation, some companies are asked for presentation. Product quality, price, financing, delivery and after sales services are required terms that must be included in the proposal. In

addition, salespeople will try to emphasize on problems and find effective solutions. Samples are also given to buyers for testing, and then comments and suggestions will be provided to sellers in order to improve and develop their products (Morris *et al.,* 2001).

Step 6: Supplier Selection

The proposals from suppliers are reviewed, and then the best supplier is selected. All members in a buying center are agreeing on the attributes used to evaluate and negotiate with the preferred supplier. The selection of suppliers depends on objectives and products a company purchases. Therefore, each company will weigh the importance of each part in proposal differently. For some companies, price or quality may be the important factors for selection (Kurtz, 2009). Moreover, selecting a single supplier or multiple suppliers will have their own advantages and disadvantages. For a single supplier, a company can get big discounts from a seller, but it takes a risk at the mercy of a sole supplier. As a result, many companies prefer to have multiple suppliers to prevent this problem (Morris *et al.*, 2001).

Step 7: Order Routine

After the selection of suppliers, the details and terms for purchasing are provided to the selected supplier (Kurtz, 2009).

Step 8: Post Purchase Evaluation

This is the final step in business buying process that the performances will be reviewed, and feedback will be provided to the sellers. The buyers can show their opinions, satisfactions and suggestions on the products' performances and also the supplier's performance (Morris *et al.*, 2001). However, the buyers will always have a chance to continue, improve or drop the supplier in the last stage (Kurtz, 2009).

2.7.6 Types of Buying Situations

A buying stage is depending on buying situations which can be separated into three types. First of all, a straight re-buy is a routine purchase that has no changes.

The same product, the same quantity from the same vendor is purchased. A new supplier and other alternative products are not searched for. The second type is a new buying situation that is suitable for anew or first time product. This type of buying situations requires research and takes long time for finding. A company will consider many qualified vendors and products; thus, they need many proposals to compare. Another type of buying situations is called a modified re-buy. There are some modifications of product specification, quantities, prices, terms, packaging or delivery that a company has agreed in the past (Hutt & Thomas, 2004).

2.8 Research Gap

Transportation continues to be growth industry. At an international level, a trend of transportation has changed because many customers prefer to use green products and services which are more sustainable and environmentally friendly. People try to minimize the environmental issues and help to save the world (Perotti, Zorzini, Cagno and Micheli, 2012). For these reasons, many transportation service providers are aware of providing more environmentally sustainable services. On the other hands, green transportation is not popular and on demand in Thailand as expected; therefore, research on green transportation in Thailand is limited. Obviously, most of environmental studies are also focused on manufacturing sectors rather than service sectors. There are few researches which have been studied on green practices in transportation service industry, especially in road transportation in Thailand. Interestingly, Thailand is one of the key ASEAN transport and logistics hubs with more than 30 Thai provinces sharing borders on Myanmar, Laos, Cambodia and Malaysia (Banomyong, 2011). Few papers are being still conducted about motivations of being green in transportation services in Thailand. Moreover, there was a gap between demand and supply on green transportation. The research of Large, Kramer and Hartmann (2013) explored that customers' stimuli for sustainability are at an early stage, and purchasing companies exert only a minor influence on transportation sustainable practices. Furthermore, the results from the paper of Wolf and Seuring (2010) showed that buying decisions of purchasers are still made mainly on the basis of traditional criteria such as prices, quality and timely

delivery where as at the present time, transportation service providers have increasing their interests in environmental issues and change their management to be more environmentally friendly.

Chapter Summary

To conclude, the related definitions in this research are presented followed by the environmental impacts from transportation which green solution is the way to solve these problems. Green transportation is a subset in green logistics that linked the concept of sustainable development. Moreover, environmental standards were developed for the purpose of environmental management which changed the company to be more environmentally friendly. Furthermore, business buyer behavior is studied in this chapter to know the steps in purchasing decisions and buying factors. Also, this chapter clarified the gap of the research. However, the research methodology was explained in the next chapter.

Chapter III

Research Methodology

This chapter discusses various research strategies commonly applied in this study. Used framework, research approach, research design, research procedures and the methods used for data collection and data analysis were described. Interview was applied in this study as a research instrument. Also, the pilot study and ethical considerations are included in this chapter.

3.1 Research Approach

There are two common views of relationships between theories and researches that are deductive method and inductive method. For deductive reasoning, it is rational when hypothesis can be proven true, then conclusions are true in regards to a particular phenomenon (Bryman & Bell, 2011). But for this research, inductive reasoning was used. This approach is more complex and used to present evidence that conclusions are the most probable. Theories which are outcomes of research attempt to find patterns to develop a hypothesis and general theories (Johnson, 2004). Therefore, a qualitative study is related to inductive reasoning whereas a quantitative study is related to deductive reasoning. However, a qualitative approach was a better fit for this research needs and questions in terms of exploration and explanation. The study was aimed to understand and analyze the information transmitted through language and behavior in natural settings. It was used to covey the expressions about beliefs, values, feelings, and motivations that support behavior which is not presented in quantitative data. Therefore, this approach was the most appropriate method.

3.2 Research Design

Burns and Grove (1997) stated that a research design is a framework of a study guiding planning for implementation and how a study will be conducted. Research designs vary on the structures and flexibility of a study. There are two central types of research strategies which are quantitative strategy and qualitative strategy. Most quantitative studies are highly structured while qualitative studies are more fluid (Polit & Hungler, 1999). A qualitative approach was applied in this research through interviews which is one of instruments for survey research in order to receive the information on social and behavior variables. This is conducted for a general purpose in order to obtain the information (Peat, 2002). Description, explanation, comparison and prediction of responses are basic functions of a survey (Knapp, 1998).

A qualitative method was implemented as an interpretative process which evaluated the meaning of contexts through inductive reasoning. Interview data and literature reviews are applied in the research in order to understand the circumstance and theories (Bryman & Bell, 2011). Semi-structured interview allows the researcher to ask more questions related to the field of study during an interview. For a qualitative research, it is focused on meaning, experiences and understanding of subjects which allow the researcher to interact with individuals.

This research was based on the perspectives of transportation service customers in Southern Thailand toward green transportation. This study was investigated to clarify ‘How’ and ‘What’ they perceive about green transportation, the challenges and opportunities to apply green transportation and these green practices related to their buying decision or not. Additionally, interpretivism and objective measurements were used in this research. Also, semi-structured interview was adopted in order to understand view points on green transportation from customers’ side.

3.2.1 Descriptive exploratory design

A research design can be described by the words 'exploratory', 'descriptive', and 'survey' (LoBiondo-Wood & Haber, 1994). An in-depth exploration is provided by exploratory studies while more information about a phenomenon and characteristics of a specific single population are gained by descriptive studies (Brink & Wood, 1994). The descriptive exploratory design is begun with some phenomenon of interest that aims to investigate the full nature of phenomenon, the manners and other related factors (Polit & Hungler, 1999). To conclude, exploratory and descriptive designs were used in this study.

3.2.2 Case Study

Case study research is an exploratory investigation while some phenomenon and variables are still unknown and applied to develop understanding in a complex matter (Meredith, 1998). According to Yin (2004), he explained that the strength of the case study is the ability to investigate in-depth "case" with its real-life contexts. Therefore, this research used a case study method because both exploratory questions and descriptive questions were addressed. In fact, a research of a case study can be either qualitative or quantitative studies that many different kinds of data collection methods were employed (Fitzgerald & Dopson, 2009). Both qualitative and quantitative data can be presented as the evidence for a case study so the readers can interpret information freely. (Yin, 2004). For this study, a case study method was based on a qualitative form which information is collected through a method of semi-interview. The unique characteristic of doing a case study is a researcher has to collect data and analyze data simultaneously (Eisenhardt & Graebner, 2007). The processes of the case study design are begun with defining case, choosing between choices of single case study or multiple case studies and adopting or minimizing theoretical perspectives. Actually, multiple cases were studied in this research as they enabled a broader exploration of the research questions. Moreover, triangulation is important in this case study method because it helps to increase credibility to a research.

Eisenhardt (1989) recommended that four to ten cases should provide evidence to support the propositions. In this research, all case companies were transportation service customers in Southern Thailand. All companies are located and operated in the South of Thailand which export rubber, rubber wood, latex and gloves, etc. Importantly, the skills and experts of interviewers when pursuing all inquiry and collecting needed data at the same time are the key demand for case study (Yin, 2004).

3.3 Research Procedures

A qualitative approach was implemented. The selected transportation service customers in Southern Thailand were requested for a semi-structured interview. This research used this instrument because the unique characteristics of the population in this study and the efficiency of data collection. The research was consisted of closed-ended and open-ended questions in order to ascertain in-depth information and other related data. The questions were developed based on the research purposes and research questions. The interview questions followed a logical progression that begin with the simple questions to the complex questions in order to create the relax atmosphere first as well as to encourage the respondents' interests and then gradually stimulate question answering.

According to Polit and Hungler (1999), they explained that qualitative data are particularly useful to find out why people engage in such behavior. This method is concerned with non-statistical methods with small purposive selected samples. However, data quality criterions have been complied when conducting the research as qualitative approach is mostly relying on the information provided from the respondents.

3.4 Population and Samples

The subjects have chosen based on the interest and curiosity related to sustainability within transportation management. Nowadays, many environmental issues occur and need urgent solving so people need to become more aware of it.

Population

The population for this study was manufacturers and exporters who use transportation services from transportation service providers in Southern Thailand. The source of population came from the Association of Southern Logistics and Transportation (ASLT). Non-probability method was implemented in this research. In fact, a qualitative research was used to characterize by in-depth inquiry which focused on the perspectives of respondents that could be explained in detail.

Samples

The desired population is called ‘samples’ (Polit & Hungler, 1999). This study was based on first-hand experience of the individuals and focused on the quality of information rather than the size of sample. There are twenty samples of transportation service customers in this research. These samples came from different types of industry which are electrical equipment and machinery, chemical and oil, paper and publishing, plastics, rubber, rubber wood, medical and pharmaceutical products. These samples located at various provinces in the South of Thailand. There are small, medium and large sizes of the companies included in this research which can be classified by a number of employees in the companies. According to European Union (2016), 10 to 49 persons are employed for small companies, 50 to 249 persons employed for medium-sized companies and 250 employees or more for large-sized companies. However, the criteria for selecting the samples could be divided into two categories which are the criteria for selecting the companies and the criteria for selecting the interviewees. The companies in these samples were regarded to the customers (manufacturers and exporters) who received transportation services from transportation service providers. Next, these companies must be located and operated in Southern Thailand. Moreover, the criteria for selecting the interviewees were based on their working experiences which at least 5 years in transportation industry and

these samples must be the people who have authorities to select transportation services providers. These samples were requested to participate in the research voluntarily. Therefore, their background and information would be secret and undisclosed by replaced with alphabet A-T instead of the companies' names.

Hence, the sample size in this qualitative method depends on when saturation of data is reached (Streubet & Carpenter, 2003). This saturation is important in acquiring a complete understanding of green transportation concept on customers' perspectives and making appropriate selection in the sample size. According to Mason (2010), it was found that the range for interview-based qualitative studies was one to ninety-five samples. Creswell (1998) recommended five to twenty five and Morse (1994) suggested at least six. However, the sample size depends on the resources, time available and the objectives of the study (Streubet & Carpenter, 2003). For this research, data saturation was twenty samples. Therefore, the details of each company was presented in the below table. In addition, respondents' grid and the background of each company are available in appendix A and Appendix B.

Respondents Name	**Company**	**Respondents Position**	**Level of Management**	**Size of the Company**
Respondent 1	Company A	Supervisor	First-line manager	Small- Sized Company
Respondent 2	Company B	Supervisor	First-line manager	Large- sized Company
Respondent 3	Company C	Supervisor	First-line manager	Small- Sized Company
Respondent 4	Company D	Supervisor	First-line manager	Large- sized Company
Respondent 5	Company E	General Manager	Middle Manager	Middle- Sized Company

Respondent 6	Company F	President	Top Manager	Large- sized Company
Respondent 7	Company G	Branch Manager	Middle Manager	Small- Sized Company
Respondent 8	Company H	General Manager	Middle Manager	Large- sized Company
Respondent 9	Company I	General Manager	Middle Manager	Small- Sized Company
Respondent 10	Company J	President	Top Manager	Large- sized Company
Respondent 11	Company K	Supervisor	First-line manager	Large- sized Company
Respondent 12	Company L	Supervisor	First-line manager	Large- sized Company
Respondent 13	Company M	Department Manager	Middle Manager	Small- Sized Company
Respondent 14	Company N	General Manager	Middle Manager	Large- sized Company
Respondent 15	Company O	Vice President	Top Manager	Large- sized Company
Respondent 16	Company P	Department Manager	Middle Manager	Small- Sized Company
Respondent 17	Company Q	Department Manager	Middle Manager	Middle- Sized Company

Respondent 18	Company R	Branch Manager	Middle Manager	Large- sized Company
Respondent 19	Company S	CEO	Top Manager	Large- sized Company
Respondent 20	Company T	General Manager	Middle Manager	Middle- Sized Company

Table 3.1: Company Classification

Furthermore, twenty companies were selected in this study which includes small- sized company, medium-sized company and large- sized company. The sizes of the company were classified by the number of the employees which explained in the part of population and samples. According to '*Contemporary Management*' written by Jones and Jennifer (2006), there are three levels of management which are top level managers, middle level managers and first level managers. These levels of management were applied to classify the working position of respondents. Moreover, the company sizes table is presented as per below;

Company Size	Company Name	Total
Small- sized Company	Company A, Company C, Company G, Company I, Company M, Company P	6
Medium- sized Company	Company E, Company Q, Company T	3
Large- sized Company	Company B, Company D, Company F, Company H, Company J, Company K, Company L, Company N, Company O, Company R, Company S	11

Table 3.2: Company Sizes

This could be concluded that more than half of these companies are large-sized company which the total is eleven companies. There were six companies that are classified as small- sized company and three companies for medium- sized company.

Sampling Technique

The selecting process for small samples to represent the desired population is called “sampling’ (Polit & Hungler, 1999). This research was based on a purposive sampling technique which is one of the most common sampling strategies. Purposive sampling can be called as subjective and judgmental sampling which is classified in non-probability sampling techniques (Polit & Hungler, 1999). Sampling techniques in non-probability method is focused on the consideration of the researcher to select the samples. Purposive sampling technique was selected to use in this research because this technique emphasized on the unique population characteristics that could answer the research question. The sample sizes in this qualitative study would not be fixed prior because it will depend on the resources and time available as well as the purposes of the study. Therefore, the researcher needs to know the purpose of the research clearly in order to be able to select the samples that are relevant to the research purposes and cut off the irrelevant samples (Mack, Woodsong, Macqueen, Guest & Namey, 2005).

3.5 Research Instrument

Interview was an important instrument in this qualitative research which could be accomplished in semi-structured ways. Interview with pre-defined questions is called structured interviews while the interview that is discussed in informal or casual contexts for exchange and share information called unstructured interviews (Polit & Hungler, 1999). The type of interviews in this research was the mixtures of both structured and unstructured interviews. The interviewees were asked by the set of questions, and they also allowed to share their experiences accordingly. Open-ended and probing questions were used in the interview as the attitudes, and in-depth information need to be expressed extensively. Thus, the questions in questionnaire were initially set from the literature review.

Moreover, the interviewer could express their feelings and viewpoints in the in-depth interview which resulted in strong background information that can lead to further questions relevant to the content. Therefore, open-ended questions were often used in in-depth interviews. This type of question would be advantageous in terms of

the depth of data from the respondents. In addition, the survey was used to investigate respondents' attitudes towards the concept of green transportation.

3.5.1 Conduction of Interviews

For a semi-structured interview, it will be more flexible, especially in terms of interview questions that may reshape or new questions may arise during the interview (Bryman & Bell, 2011). According to Bryman and Bell (2011), five basic elements are used for interview guideline. Firstly, there should be a sequence and flow of topic area. Secondly, questions should be sorted by research question and purposes. Thirdly, a language should be comprehensible to all respondents, and complicated language should be avoided. Fourthly, the respondents have freedom to elaborate as the questions will be formed in a way that not leading. Finally, information was recorded in general and specific kind to help contextualize the responses.

Therefore, the interviews were conducted in forms of face-to-face and via telephone in Thai language. The companies were contacted via email, telephone and walk-in. Each interview was booked according to the agreed date and time. First of all, the data collection guide was sent to each respondent beforehand, so the respondents would have time to grasp and prepare their answers. Therefore, an introduction of researcher began in the first step of each interview. The researcher had to ask if the respondents wanted to show their identities and the interviews could be recorded or not. Fortunately, all interviews in this research could be recorded. Besides the interviews, secondary data were used to enhance and explain the information collected during the interviews. After that, the respondents were asked to allow further contact in case of new questions that would arise. Then, a copy of the study will be given to every respondent after the date of publication. Moreover, with in-depth interviews, it is difficult to analyze the data clearly due to the interpretations and hidden meanings. So, respondent validation was applied in the study for accuracy of the data. Questions may have varied slightly for each interview in this semi-structured interview method. When conducting in-depth interviews, there was a risk of that the interviewers will influence on the participants in its answers (Malhotra, 2010).

3.5.2 Design for interview questions

The questions composed of open-ended questions which were divided into the following contents:

- Company Profile
- The Awareness of Environmental Issues
- The Perceptions about Green Logistics and Green Transportation
- Challenges and Opportunities for Green Practices
- Buying Decision Criteria
- Recommendations and Suggestions

Consequently, these interview questions could answer the research questions and research gap which explained in chapter 5 (Discussion and Conclusion Chapter).

3.6 Data Collection

There are several approaches to collect the data which can be both primary and secondary sources. Evidence which was collected directly from the interviewees or transportation service customers are called primary data, and secondary data are information that has already been published. Data were collected by interviewing in order to ensure full and accurate information until saturation was reached. Each participant had their chances to provide their biographical data on their names, companies' names, their current job positions and their responsibilities. However, it was necessary to guide the participants to get the desired information. Interviews were conducted directly with the transportation service customers in Southern Thailand regarding green transportation.

Moreover, a semi-structured interview was applied as it was the most appropriate way which allowed the opportunity of asking broader questions in an unplanned structure. The respondents were allowed to express their thoughts without restrictions and the interviews were conducted with both closed-ended questions and open-ended questions. All the interviews were recorded and taken notes for the purpose of reviewing. Twenty interviews were started from April to June 2017 as the appointments were needed to collect data. All of the interviews were conducted in

Thai language and lasted about thirty to forty five minutes due to face-to-face and telephone interviews.

3.6.1 Pilot Study

The measurement procedures and instruments have to be reliable and valid, so before distributing the questionnaires, pretest is needed. The researcher has to make sure that the respondents understand the questions and can identify unclear point then revise the questions before finalization. Pilot test aims to know how the respondents will perceive and interpret the questions to reveal in some changes and adjustments. The respondents are asked to consider the contents, wordings and instructions carefully and clearly. Importantly, the pilot test is necessary method when designing a good questionnaire (Queensland Health, 2007).

In this research, pilot test was used with a group of five transportation service customers before the questionnaire was finalized. A pilot study was applied in order to know that all interviewees had same understanding about the questions. If there are any problems about the questions, the researcher had to revise, recheck, and then retest it again. Also, the interviewees in the pilot study were not the same people selected to be the research samples. The results from pilot test in this study reflected that all respondents could understand the questions in the same direction. Moreover, most respondents knew ‘ISO’ as widely used as an international environmental standard.

3.7 Data Analysis

The results of qualitative analysis involves to reveal the conclusions and understand the overall image by using research findings to describe the incidences and meanings connected to theories presented in literature review with results found in empirical findings (Brockopp and Hastings-Tolsma, 1995). In this study, data analysis started when data were received from the participants. A researcher has fully understood data which will be done in constant interaction. While collecting data, a

researcher has to be opened to the pure form of information and reduce bias in order to analyze data in an honest and objective way (Streubert & Carpenter, 1999). After that, all data would be read until the researcher understands the meanings. Before analyzing data, a researcher used bracketing which will exclude all preconceptions about investigation. The data was interpreted from the recorder to the computer program. Interpretation was important process to organize and analyze the data for this study. Then, the data from qualitative interview had filled into a computer in order to be coded, counted and analyzed. A method of identifying and coding data needs to be developed that is called thematic analysis. It helps to clarify the data collected and focus on the important messages and findings (Tesch, 1990). Coding is important for data analysis which themes and codes will be drawn in order to review the interview transcripts, grouping data, analyzing and interpreting that information (Sumana & Gordon, 2016). Therefore, the samples of the code book are available in appendix D for references. Moreover, content analysis was applied for a procedure to categorize the verbal data to classify and summarize the information.

The criteria for measuring a rigor in qualitative research are credibility, audit ability, fittingness and confirm ability (LoBindo-Wood & Haber, 1994). A large amount of data in qualitative data is one of the problems that the researcher has to handle in order to get a correct analysis (Bryman & Bell, 2011). Also, a researcher has to be more concern on the implied responses from the respondents which can be called a latent level of analysis (Tesch, 1990). In Addition, regarding Miles and Huberman (1984), it is helpful to extract the received data first followed by analyze and display the data. Then, the researcher can draw the conclusions and verifying theories easily. These steps are all related that mutually support another. All three activities occur, at least in part, during the process of data collection and may influence data collection (Patton, 1990). The data analysis strategies discussed in this section were thematic strategies which attempting to generate the concepts and themes from raw data and content strategies which attempted to treat the data as a coherent whole and retain as much of the raw data as possible in order to capture the whole contexts (Webb, 1999). Then, all results were presented to aggregate and

organize in an immediately accessible and fitting form so that the researcher could decide to draw the conclusions or go to the next-step analysis (Miles & Huberman, 1984).

3.7.1 Back Translation

A back translation or reverse translation is a translated process of a previous text back into its original source language (RixTrans, 2013). Back translation is a procedure which a translator translates a document into another language, and then translates back to the original language such as English to Thai to English. A translator who does back translation should be a person who has not seen or worked on an original text (Prayongsap, 2011). Generally, all languages are different, so all hundred percent translations can't be exactly the same as an original source text (RixTrans, 2013). However, back translation will assess the same or similar meaning between an original source and target texts for validity, accuracy and readability. This is a useful tool in order to ensure a level of quality checking in order to avoid errors before making decision (Kaytie, 2016).

Moreover, different translators will use different procedures and different styles in translation. In this study, back translation was used to translate from Thai language back to English language after an interview process because a translation procedure could help interviewees to be more understood with the local language (Thai language) of interview questions. Therefore, back translation is an important procedure which helps translators to translate interviews' questions and answers into other languages effectively (Newmark, 1988). Thus, the translation procedures used in the study were listed as follows.

Step 1: Read an original text (Thai language) to understand its contents such as meanings and tones among lines.

Step 2: Interpreted this original text (Thai language) into a target language (English language) with appropriate procedures by considering main sentences and

keeping original meanings, tones and styles. This stage was done by researcher first then checked by native speaker and approved by research advisor.

Step 3: Checked and revised a translated text whether or not a reader understands the same as they read the original text.

Therefore, the translation presented the subject matter of the source text which is expanded or omitted the source messages, but still maintains the original meanings. The translated interview scripts were sent back to the respondents in order to check the meanings and contents.

3.7.2 Triangulation

De Vos, Strydom, Fouche and Delport (2002) stated that a qualitative study is associated with the concept of triangulation for validity purpose. Therefore, triangulation of sources was used in this research to verify the consistency of the different data sources by the same method and compare different viewpoints from different respondents. Moreover, Mouton and Marais (1990) argued that triangulation can increase reliability of observation by using multiple methods of data collection. Triangulation can overcome deficiency and has a potential to enhance validity of findings (Babbie & Mouton, 2001). Multiple sources of data used in this research were primary data (the results of the interviews) and secondary data from the literature. The qualitative method was applied through the interviews with transportation service customers in the different times and different places. Respondent validation involved in the research when the information was given back to each respondent and feedbacks were obtained from them to check for accuracy.

3.8 Ethical Considerations

There are four main areas of ethical considerations from Bryman and Bell (2011) that applied in this research. Firstly, ethical codes were followed in order to be respected and acted carefully to make sure that harm to either participants or non-

participants was none or minimal. Next, needed information was given to participants, including background of a researcher, the intent of the research to inform the participants as well as provide them the chances to participate or refuse to cooperate. Plus, names of any participants who requires to remain anonymous would be undisclosed. Moreover, the participants did not have to answer any questions that they don't want to answer. Then, the purposes of the study were clarified clearly in order to prevent any frauds.

Chapter Summary

To conclude, the methodologies used in this research are presented in this chapter, including the planning, design, and selecting the samples used in this research. Data collection and data analysis are simultaneous steps in qualitative research, as described in this chapter. Moreover, the moral and ethical of research is very important matter which the researcher must always be aware. However, the results of the research are explained in the next chapter.

CHAPTER IV

Findings

This chapter presents in-depth interview results from data collection process regarding research methodology. The findings of data collection were gathered by semi-structured in-depth interview method. The data from the interviews derived from face-to-face interviews and telephone interviews with the transportation service customers in order to gain complementary results. The transportation activities and suggestions are also presented as summarized findings.

4.1 Impacts from Transportation on Environment

This study was found that the transportation activities could have bad effects on environment, particularly to areas closed to harbors such as road areas. The effects could be separated into direct and indirect effects. The examples of the direct effects are such the use of oil from transportation vehicle while moving goods from one place to another, air pollution, noise pollution, and accident rates. In the same time, the indirect effects could be explained as the cumulative impacts from pollutions related to health problems, climate change and scarcity of natural resources. Although the development of vehicle engine technology enables the efficiency of fuel and oil consumption, the total fuel and oil consumption is still high along with the increasing number of vehicles used to support the transportation activities. As participants articulated about transportation activities, especially on land-based transportation presented as follow:

"There are many types of transportation. For freight transport in our businesses, it means the process of transporting goods and cargo by sea, rail, land and air. The company mostly uses to transport by trucks and then transfer to the ship.

Normally, land-based transportation produces high emissions of carbon dioxide that affects natural surroundings, humans and animals negatively.

(Respondent 1)

"The burning of oil in the transport of goods from trucks causes greenhouse effects which trap heat and make the planet warmer. We have to accept that transport activities are one of the largest sources that increase greenhouse gases in the atmosphere."

(Respondent 4)

"Freight transport causes many subsequently severe losses and damage in both quality of life and economical aspects."

(Respondent 10)

Moreover, shipping also causes some negative effects on both environment and human life as the following examples.

"Also, if the ship is shipped out, the construction of the harbor would harm natural areas. Transport by shipping can put pressure on natural resources to be scarcer. Forests will suffer negative impacts in a form of deforestation caused by fuel wood collection and land clearing. Importantly, pollutions such as air emissions, noise, waste, release of sewage, oil and chemicals pollutions are occurring."

(Respondent 9)

"Aquatic environment will be affected by vessel transportation, which some species may get extinction and cause harm to the environment around ports and coastal areas."

(Respondent 13)

"Transport by ship also produces air pollution which comes from dirty fuel they burn and can lead to serious human health problems, especially for people in port communities."

(Respondent 14)

Logistics is a strategic management process for removal and storage of goods, spare parts and goods from the suppliers, between companies' facilities and amenities to their customers. The purpose of logistics activities is to reduce costs, especially on transportation costs. In addition, time economy and improvement in the reliability of services, including flexibility are also important for transportation. However, all of the respondents thought that there are some negative impacts, more or less, as the side effects from transportation activities, such as air pollution and noise pollution. For instance;

"Transportation activities produce indirect effects, but no direct ones. It does cause some problems in terms of traffic jam and causes high emissions. As I have heard that 27 percent of greenhouse gas emissions in the year 2015 came from transportation sectors as over 90 percent of fuel used is petroleum based which includes gasoline and diesel."

(Respondent 3)

"Transportation can produce both direct and indirect impacts. For direct impacts, noise and emissions from transportation activities will harm environment and people's life, along with indirect impacts. Indirect impacts are cumulative impacts from pollution linking to respiratory problems, climate change, global warming, etc."

(Respondent 9)

"Climate change and global warming are the environmental impacts of transportation systems which come from the accumulation of incomplete combustion

done by an internal combustion engine. Therefore, these problems are the total impacts of several natural and human-made factors."

(Respondent 16)

Transportation is the largest part in logistics which gives significant impacts into environment compared to another activity in logistics process. The impact of transportation to the environment could be direct and indirect. For example, the increasing air freight will produce air pollution as a result of fuel consumption of the airplane which is the direct impact, and the development of transport infrastructure such as the expansion of road is the indirect impact of transportation to the environment which affect to the living things and ecology. Goods transportation will affect the environment directly in terms of emission of air pollutants. There are many environmental impact categories, for example;

"Since trucks usually run during heavy times and in rural areas such as schools and urban area, it causes traffic jam leading to many subsequent losses and damages, for example, stress of people and economical losses."

(Respondent 5)

"For the effects of traffic jam problems, people have to spend more hours to travel. They have to wake up early to avoid the traffic. This leads to the stress of people."

(Respondent 11)

"When traffic jam occurs, waste of fuel and energy are results which lead to negative impacts on the ecosystem."

(Respondent 12)

In addition, traffic is the cause of noise pollution. If people live in busy streets or near the airports, they will be greatly affected by noise pollution. The effects of noise pollution include the nuisance, communication problems, sleep deprivation and cognitive dysfunction, resulting in loss of working efficiency. Noise from trucks could be from tires and engines. Also, air transport causes high levels of noise as well. Furthermore, the findings mentioned about the leakage of fluid or oils through water transportation that could release pollutions to the water. Another possible cause is the fall of containers containing chemicals, fertilizers, and similar products from the vessels. These kinds of water pollution will danger the plants and animals that live in the sea.

4.2 Challenges, Trends and Opportunities for Transportation Industry

The most important trends affecting transportation business are economic situations, expansion of international transportation and importantly the development of the internet technology, etc. Thirty percent of respondents referred to economic situations as presented below:

"*Transportation industry depends on economic situations as economic growth pattern will affect the development of the industry. If the economic situation is good especially on export and import, transportation business will be also boomed and developed.*"

(Respondent 1)

"*Better overall transportation performance is strongly associated with trade expansions, export diversification, investment and economic growth.*"

(Respondent 8)

"Economic situations especially in China are really affecting manufacturing and export industry as China is the big buyer and investor in Thailand."

(Respondent 10)

"The growth in economy will be lower due to the global crisis and many companies will postpone any investment."

(Respondent 16)

Similarly to other most industries, transportation is currently confronting immense change which brings both risk and opportunity. New technology, new market entrants, new customer expectations, and new business models have been appeared. Consequently, this results in higher competition, especially in terms of price which ten percent of respondents also mentioned as below.

"Fierce competition in transportation industry is about price strategies. Price war between companies will affect transportation industry. Companies can't decrease their prices to be lower and lower to compete with others perennially because they will get losses in one day and their service quality will be also decreased subsequently, so the development in transportation industry will not occur."

(Respondent 7)

"Many new comers will enter transportation industry, so they try to lower their prices to persuade customers to compete with others. Therefore, variability of market and inability of making reliable forecasting of demand in this industry are needed to be concerned."

(Respondent 9)

Moreover, the road and the railway systems will be negatively affected if they are not improved. The findings shown that road transportation is the main mode of transportation which linked to other transportation modes, for example, road is used to transport goods from receiving point to the ports, train stations or airports. Twenty five percent of respondents cited below;

"The road and railway are not developed well. Presently, a road-rail parallel layout is used worldwide especially in Europe. This layout is a designed option to reduce environmental impacts as well as transportation cost."

(Respondent 6)

"Traffic Management plan should be developed for site access roads and use of main public roads. Also, instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow."

(Respondent 12)

"Restore roads to be equal or in better condition than before may help to reduce accidents and increase effectiveness of transportation."

(Respondent 13)

"Using the road and rail parallel layout will minimize the number and length of roads and use railway together in terms of saving cost with increased quantity of transferred goods and reduce impacts on the environment."

(Respondent 18)

"Road-rail parallel layout is the new transportation route in order to reduce environmental impact, energy and cost by locating railway tracks alongside a highway."

(Respondent 19)

In addition, the railway has received more attention due to its cost effective and large capacity to carry goods. Road-rail parallel layout design was mentioned because this option provided less harmful to the environment and increased more efficiency for transportation system. However, this model has not been popular or applied in Thailand much.

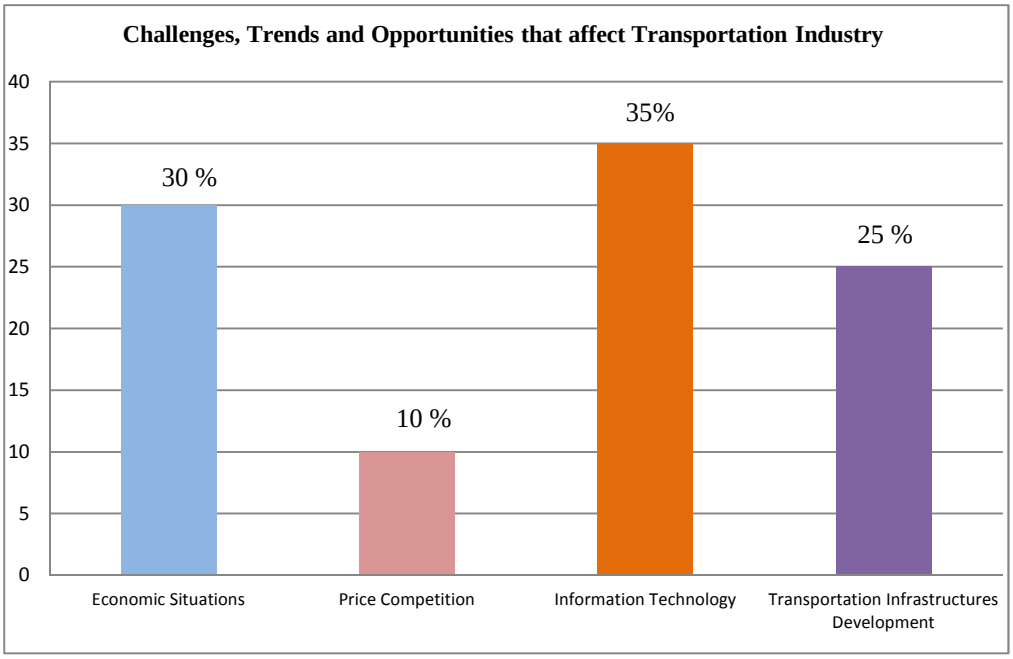

Figure 4.1: The Most Important Challenges, Trends and Opportunities that affect Transportation Industry.

Therefore, the data can be interpreted in Figure 4.1. The results showed that thirty five percent of the respondents thought that information technology (IT) is the most important trend affecting transportation industry while thirty percent of them

stated that economic situations such as export, import, trading and exchange rates also extremely affect transport services sectors. Twenty five percent was considered about the development of transportation infrastructures and ten percent was for price competition in the transportation market.

Since the expansion of the multinational companies, the implementation of IT becomes more and more important. Currently, large multinational companies have the largest market share so local companies are often acquired by larger companies. Otherwise, it is difficult to stay independent because technologies link everything together so it requires the dependency in terms of partners and alliances. Globalization and availability through the Internet, as well as new communication channels, help spread the customers around the world. The globalization of business will give positive impacts on transportation companies. Global companies as well as the online market could not avoid the role of transportation companies for delivering their products to their customers. On the other hand, transportation companies are not able to deny the use of information and technology to improve their work efficiency, reduce costs and improve the environment management.

"*Information technology plays an important role in the global market as it has given business the tools to find suitable partners or alliances in order to solve complex problems.*"

(Respondent 2)

"*Current international transportation is affecting the industry which expected to expand widely and rapidly. IT systems are brought together to make them as effective as possible. Foreign investment in transportation business is increasing as key information is spread worldwide.*"

(Respondent 4)

"The increase of the online system becomes more important. Information technology or IT drives an innovation which is the path for business success and revolution. Now, many businesses get the benefits from digital revolution as active learning and more communicating via internet."

(Respondent 5)

Innovation is the key for business success, and it is driven by information and technology. IT helps life to be easier and more convenient. Also, it helps business run efficiently as well as increase value, quality, and productivity. There are many changes in business from IT such as online shopping, digital marketing, e-business and social networking. Therefore, many respondents agreed that information and technology is very influential for their transportation at these present days.

"The innovation of IT has been adapted to transportation businesses which tend to improve resource management as well as increase customer supports. Internet makes it easier to communicate with customers and also reduces communication costs"

(Respondent 9)

"Innovation from information technology results in smarter applications improved data processing and data storage, and wider information distribution. Therefore, IT is the smart tool to lead transportation service providers to work more efficiently and productively."

(Respondent 11)

"New formula for business success is used to drive an innovation with information technology. For environmental protection, e-custom is one of the results

from internet technology that provides more convenient and use less paper for custom clearance."

(Respondent 14)

"I agree that IT can increase value, enhance quality and boost productivity of transportation services such as GPS tracking system, online car camera, client application and Google map"

(Respondent 17)

The global market is more reachable than ever before, and this have leaded to increase competition; for example, competent workforce and manufacturing resources are found everywhere around the globe today. In conclusion, there are mutual advantages between global markets, transportation companies and the development of internet technology implementation in supporting the transportation management.

4.3 The Development of Transportation Systems in Thailand

Transportation is the flow of goods management between a place of origin to the place of destinations to meet desired needs, such as needs of customers and companies. Generally in transportation system, there is an integrated management to receive and move an item up to its customers. For some specific products, transportation service providers starts with taking goods by trucks then transfer to other modes of transportation such as trains or vessels. In case of this research, land transportation is the major domestic transportation mode in Thailand which generates big revenues to the country but at the same time, many problems occur which obstruct the flow of transportation, for example, road conditions and land transport management systems as forty five percent of respondents indicated that;

"*There are still problems with the timing of unconfined shipping. For transportation, time is really important, but now we can't control on the time factor*

because the transportation system in Thailand is not working properly. Road is still repaired for long times and congestions problems can't be solved effectively."

(Respondent 8)

"*Thailand's economy is paying a significant cost premium for a lack of available competitive transport options. Lack of an integrated transport system is now affecting the competitive position of Thailand compared to its neighbors."*

(Respondent 9)

"*If transport infrastructures in Thailand are improved, this will stimulate more investment, regional competitiveness and economic development."*

(Respondent 16)

Moreover, the railway is underdeveloped and also other transportation systems are not ready to support the efficient transportation. The limitations of rail transport in Thailand are the constrained rail routes, insufficient rail equipment and low standard of working, etc. As a result, the private sector rarely uses train to transport their goods, for instance;

"*Transport by railway has many advantages in terms of quantity, costs and environmental saving. Many countries developed their railway systems to increase their capabilities for transportation but the railway system in Thailand has not been ready and still developed for very long time."*

(Respondent 2)

"*There are many obstacles that obstruct the development of railway transportation and make Thai railway system lags behind other countries that which involved problems with equipment, terminal/distribution center, railway tracks and railway vehicles."*

(Respondent 6)

"The rail expansion project may greatly support the international transportation development policy. If Thailand has well-planned logistics development and transportation system, we will play a key role in the Greater Mekong Sub-region (GMS) or an international economic corridor by becoming the center of logistics and goods distribution under the North-South and East-West Economic Corridor Development Plan. Accordingly, rail transportation will need to be streamlined to keep pace with the needs of the private sector to work against time. In addition, the continuous development of railways has been added.

(Respondent 7)

"Thai railway has a large expansion opportunity as it could potentially become an efficient vehicle that supports the trade in the Greater Mekong Sub-region (GMS), and this will become the opportunity to consider granting investment. However, Thai railway system has to prepare the necessary infrastructures and other facilities to meet the increasing needs such as locomotives, carriages and lifting equipments."

(Respondent 14)

"The advantage of rail transport is the ability to transport large amounts of goods over medium to long distances. It can also handle large items with efficiency, timeliness, safety, speed, and at a lower energy consumption compared to road transportation. In fact, rail services performance in Thailand is inefficient due to the delay problem which not match with the schedule and it also takes longer time than road transportation."

(Respondent 18)

Railway is the efficient mode of transportation in terms of cost effective, fuel efficiency, traffic improvement and energy saving which can provide economies of

scale by moving many tons of goods at once. The efficient cost of rail transport can increase the competitiveness of manufacturers and exporters in the domestic and global markets. Besides, Greater Mekong Sub-region (GMS) will be greatly supported by the expansion of international economic trade in the future. Therefore, Greater Mekong Sub-region (GMS) comprises of six countries along Mekong River: Laos, Cambodia, Myanmar, Vietnam, China and Thailand. Accordingly, government should consider investing in expanding the services in the country, if possible, as a result of international opportunities which have been already established. Importantly, water transport network will be enhanced in Kingdom of Thailand. Thirty percent of respondents also pointed out the importance of water transportation development in Thailand as below interviews.

"The opportunity for freight transport expansion is actually relatively obvious in many areas of the country. LaemChabang and Latkrabang ports are the good examples for developing a container transport line in Thailand as it can be continuously employed to increase the transportation volume. However, at these present days, Laem Chabang port is experiencing congestion in container handling which needs urgent solving"

(Respondent 12)

"The water transportation development linked Thailand with neighboring countries and linking boarder gateways with Thailand's regional hub is very necessary. Water infrastructure development in Thailand is another channel for export and import activities which help to generate the large amounts of revenue each year."

(Respondent 13)

"Moreover, it was found that the supporting infrastructure for water transportation has not been developed yet since the port still depends on other neighboring countries such as Malaysia, Singapore, and Indonesia. Thailand has several challenges in terms of increasing its competitiveness through water

transportation as the results from the narrow of deep channel and the shallowness so it is hard to transfer goods. Also, the infrastructure is not sufficient and no direct connected roads to the pier."

(Respondent 15)

"The development and expansion for inland container depots and shipping ports such as LaemChabang and Songkhla deep water ports will be used to offer highly promising opportunity for the service expansion and networks for transportation in Thailand. This matter should be taken to consideration from both public and private sectors as soon as possible. Nevertheless, environmental issues from the construction and expansion of the ports are important to be considered carefully."

(Respondent 17)

"For shipping the goods, if we have our own effective ports, we will not have to depend on other ports such as Malaysia and Singapore ports to ship goods. Moreover, the development of our own ports in Thailand can reduce costs as well as earn incomes to our country. Importantly, the problem of obsolete legislation, such as licensing issues and the registration of the vessel should be solved. In addition, the delays in management of the port such as goods clearance should be concerned."

(Respondent 19)

Consequently, water transportation is an important gateway between Thai and foreign trade and will be even more important in the future under the economic strategy that aims to develop Thailand as a regional hub of the manufacturing industry. The potential development of international water transportation is an urgent needed. The development of cargo terminals is an important part of the overall development of water transportation. It needs to be developed alongside with other transportation systems in order to support the volumes of entry and exit of goods that will increase according to the growth of the economy in the future. Therefore, the increase in the number of containers entering and leaving the port each year has resulted in the

development and construction of new ports which all concerned parties are interested in.

Additionally, transportation activities related to the logistic performance which is measured by Logistic Performance Index (LPI). LPI was published by The World Bank which is measured by six indicators, namely (1) the efficiency of the process of customs / clearance, with respect to the speed, simplicity and predictability formalities by border control agencies, (2) quality of trade and transport infrastructure, (3) affordable and competitive price per shipment which indicates the availability of international shipping connections, (4) potentiality and quality of logistics services (transport operators, customs service maintenance companies / customs brokers), (5) the ability to trace the shipment tracking when sent to a particular country, and (6) timeliness which shows the frequency of submissions received by the recipient for shipment within the scheduled or expected to measure the reliability and predictability chain (The World Bank, 2016). Some respondents also explained about this, for example;

"*International LPI can be the most relevant indicator when used to examine the relationships between the development of the logistics infrastructure and economic development.*

(Respondent 10)

LPI is a unique dataset to measure country performance across several dimensions of logistics which will directly support reforms and investment in trade and transport facilitation."

(Respondent 20)

Based on the LPI report in 2016, Germany was ranked in first place with a score of 4.23. Regarding in ASEAN countries, the first rank is occupied by Singapore

(ranked as 5th of the world), Malaysia at 2nd position (ranked as 32th of the world), Thailand at 3rd position (ranked as 45th of the world); on the other hand, Lao People's Democratic Republic was ranked as the most protruding stuffed (ranked as 152th of the world) (The World Bank, 2016). Regarding to the subjects' opinions and the LPI indicators, it was concluded that even though Thailand was placed at the 3rd position in ASEAN countries and 45th of the world, Thai logistics system weakness is on the transportation system and the lack of sea ports. Without well-developed transportation systems, logistics could not bring its advantages into full play (The World Bank, 2016). Furthermore, all respondents thought that Thailand has the potential to be the goods distribution hub in ASEAN due to its good location so it is necessary to be developed, for example;

"Actually, a transportation sector is one of the most important sectors that contribute the revenues to Thailand since Thailand is counted as the large source for exporting goods to developed countries such as USA, Japan, and China. However, Thailand is still (on the way to) being developed and backward when compared to other countries in ASEAN."

(Respondent 3)

"Thailand is a regional manufacturing that has the a prominent position and ability to successfully meet the high demand for cross-border transportation services in ASEAN"

(Respondent 4)

Medium to long distance transportation plays an important role in driving economic and social development by distributing goods to various regions in the country. In Thailand, the demand of road freight transportation has been continuously

growing. Road traffic congestions can usually be observed as the results from transportation systems that are not still complete, as one of the respondents stated below:

"Such congestion has increased the use of transportation fuels so the cost of transportation also increased. When transportation costs increase, price also rises up. Moreover, congestion also contributes many environmental problems as well."

(Respondent 5)

Thus, environmental protection should take into account the development of transportation systems in Thailand as environment is the natural surrounding which helps life to grow nourish on the earth.

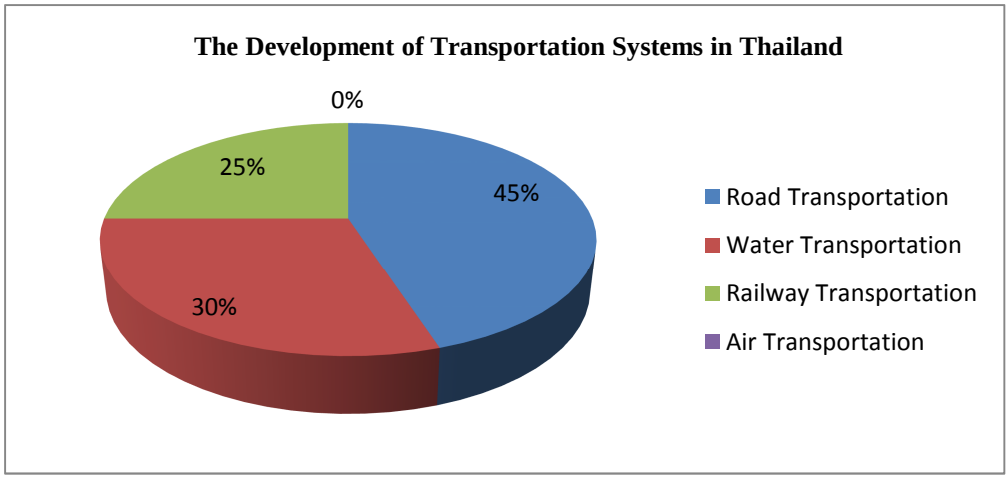

Figure 4.2: The Development of Transportation Systems in Thailand

As shown in Figure 4.2, almost half of the respondents counted as forty five percent considered that road transportation in Thailand really needs to be improved, for road freight transport is the major mode of transportation in Thailand, followed by water transportation (thirty percent), and railway transportation (twenty five percent).

Interestingly, no one was mentioned about airway transportation because it takes high cost and is not popular in Thailand. Most of respondents in this study are manufacturers and exporters who mostly use land-based transportation by trucks. Their goods are heavy and stuffing in containers, so air transport will not suitable for them as it is quite convenient to send light goods with expensive prices.

Thus, a good transportation system in logistics activities could provide better logistics efficiency, reduce operational cost, promote service quality and decrease environmental impacts. The efforts from both public and private sectors are needed to improve the transportation systems. The competitiveness and good enterprises management could be increased by a well-operated transportation system.

4.4 Transportation for Environment and Sustainable Development

The respondents' opinions about "Transportation for Environment and Sustainable Development" were explored in this part. The results were highlighted that more than two-third (80%) of respondents agreed on environmental transportation and sustainable development while only twenty percent of them de-emphasized on this matter.

Sustainable Development	No.	Percent
Agree	16	80
Disagree	4	20

Table 4.1: Transportation for Environment and Sustainable Development

The study was found that the respondents' understandings varied as many of the respondents agreed that transportation may be environmentally friendly in order to decrease the impacts on the environment. Transportation for environment and sustainable development from the perspectives of the respondents referred to green transportation. It was a good idea to have the plans to deal with environmental problems, as mentioned examples presented below.

"I have heard from the seminar about green logistics and green transportation and I think that it is good news for transportation industries that will have the ways to solve the environmental problems released from the businesses. It is suitable for running the businesses with no destroying of the ecosystem as well as saving ecology and the world."

(Respondent 1)

"Green transportation is an interesting topic which has applied in many countries such as USA, England, Germany, China and Japan. These countries get affected from the deterioration of the environment as a result of pollutions created by human beings. So, these countries have solved these problems by using green solution. Therefore, this is a good example for us to follow them."

(Respondent 2)

"Instead of oil, gas that is purer and accepted to save the environment by polluting less emission may be used in order to carry out sustainable development in transportation system. Moreover, electric vehicles will be recognized and used more widely in the future."

(Respondent 3)

Respondent 6 and 16 also supported that "Green Transportation can contribute to sustainable development. It is also beneficial for effective economy, society and environment. To promote energy-saving and environmentally friendly transportation, encouraging shift modes of transportation and developing clean technologies for energy and vehicles use are needed."

"All types of transportation have the negative effects on the environment so the business sector has to be more responsible for this part. This is a good sign that

the business sector is responsible for the environmental problems. For the transportation sector, green transportation is the most appropriate way which helps to reduce environmental problems, for example, backhaul management, carbon emission monitoring and the use of internet and technology to help transportation to be more efficient."

(Respondent 19)

At the same time, driving behavior is also important in green transportation activities. The core value of eco driving is driving with the caution while reducing costs and reducing the impact on the environment. Safety driving is one part of eco-driving which is a safe driving behavior that is used to minimize accidents. Safety driving is the basis of driving behavior that is more attention to safety, especially for the driver itself and generally on passengers. Safety driving is designed to increase the driver's awareness of all the possibilities that occur during driving. Aspects of the important for safety driving are namely the condition of the driver before driving, driving equipment, preparation of the vehicle before travel, and on the way.

Right now, eco-driving is one of green transportation activities that I think about. Environmentally-friendly driving practices include a variety of practical approaches, such as gentle brakes. Do not brake and throttle often to keep the engine speed constant so it can save more energy.

(Respondent 8)

"One of eco driving techniques is keeping the distances between the front vehicles which can reduce the accidents and traffic congestion. However, eco driving behavior mainly depends on the drivers. Therefore, they must be trained and teach the right way to environmentally friendly drive."

(Respondent 12)

"Drivers should adjust the temperature of the air conditioner in the car to be about 25 Celsius in order to save fuel. Moreover, they have to turn off the engine every time they park or stop their trucks because it is a waste of fuel and danger to life"

(Respondent 20)

On the other hand, it was the opinions of the respondents which thought that green transportation is a difficult thing to happen and actually work. This might be the problems in terms of cost or inexperience issues such as;

"On the other hand, there may be higher costs of developing green transportation such as the cost of modifying car systems from oil to gas based engines, so big investment is required but it is difficult due to the downturn of economy today."

(Respondent 11)

"Therefore, the government should promote sustainability development and sufficient economy in order to create more awareness to people and business owners. For green transportation in Thailand, only small numbers of people know about this subject, and it is a new matter which needs time to learn"

(Respondent 18)

As it is known that the logistics activities are one parts of a supply chain. A supply chain is a network of the entire organization (from a supplier to the end user) and the activities associated with flow and transformation of goods, information and money (Handfield & Nichols, 2002). While supply chain management is integration of business processes in a form of collaboration between supply chain partners in providing products, services and information to improve company performance and provide added value to customers and other stakeholders (Purnomo, 2010). Accordingly, some respondents suggested that if a company would like to involve in

the green transportation plan, the whole processes of supply chain in their companies should be also considered. For example, a company should pay attention on how to get the material, how to transport it and also how to manage it, and even how to transport the end-product to the door of their customers. These should be all taken into account of the concept of green transportation.

"*Transportation for the environment and sustainable development will contribute less impact on air pollution which is one of the causes for greenhouse effects. Using gas instead of oil does not only reduce emission rates but also help a company to save primary cost which is oil. However, changing to way of green transportation will require the understanding and cooperation from all parties in supply chain to be successful.*"

(Respondent 4)

"*Transportation and the environment are something that have been heard and thought that it should be gone hand in hand. Green transportation should be preserved even it sounds difficult, but green concept and transportation can go together. Going green should start from the point of origin throughout the end in the supply chain in order to work in the same way.*"

(Respondent 5)

"*In fact, there are the standards used as a guideline in order to go green for businesses. However, green transportation can be successful if there is a strict law to enforce business sectors to practice seriously. Going green will not be successful if one of related parties in the supply chain is uncooperative.*"

(Respondent 7)

Respondent 9 and respondent 10 also agreed that *"earning serious government support is important, for example, to limit the weight not to exceed the limit and correct driving behavior of drivers."*

"Sustainable development will provide the benefits throughout supply chain which including key stakeholders, investors to customers and employees. For transportation sector, it is a good idea to develop transportation management network between transportation service providers, such as jointing truck planning for full trucking, linking information between agencies, suppliers and partners to transport inputs and goods together to reduce empty transportation."

(Respondent 13)

"Transportation is one of the activities in logistics and logistics is a part of supply chain. Therefore, green transportation will be effective if all sectors, from suppliers to consumers, cooperate and help each other to drive to sustainable development."

(Respondent 15)

On the other hands, about twenty percent of respondents did not know about green transportation and they did not pay more interest on this matter. They had the negative opinions on the initiation green transportation as follow;

"I have never heard about green transportation or environmental transportation at all. It sounds as a conflict and difficult to happen or being effective for transportation industry."

(Respondent 14)

"*The sustainable development in transportation industry may be referred to reduce the negative effects on the environment and lead to improve the natural surroundings and life on earth to become better. By the way, this may be only happening in theory.*"

(Respondent 17)

Nowadays, businesses and consumers' concerns for environment are increasing, as well as issues concerning about the concept of environmentally friendly has been forced the companies to adjust to the concept of green transportation in every business process. Green transportation management requires companies to continuously improve their transportation performance in order to comply with environmental regulations. Companies have various reasons to implement the green transportation, ranked from just a reactive policy to proactive approach to gain a competitive advantage and improve their competitiveness through the improvement of their environmental performance. Environmental issues will certainly affect the future transportation system development and contribute to that new parameters have to be taken into consideration. Even if the environmental aspects alone will not be the primary driver for the transportation development, it will together with aspects of the globalization and increased competition, contributed to changed prerequisites.

4.5 Criteria in Determining the Choices of Transportation Service Providers

Several criteria found in this study were used to determine the choices of transportation service providers, namely capabilities, prices and reputations. All respondents clarified the most top three criteria that affect their decisions for selecting the transportation service providers. Businesses were being refocused on strategies that differentiate them from their competitors. One factor that is very important to concern was capability to work which thirty five percent of respondents cited as per below,

"Capabilities of carriers are the most necessary factors that the transportation service providers must have."

(Respondent 2)

"Assistance from transportation service provider when any problems occur during transportation is needed. So, they must have specialized skills in this working field in order to satisfy customers' requirements"

(Respondent 13)

"The important factor is working consistency. Transportation service providers must maintain their service quality in order to build confidence to their customers."

(Respondent 14)

In this study, punctuality refers to the accuracy and speed of transportation companies in delivery goods to destination addresses. For a company, delivery of raw materials is very important to a production process. Delays in delivery of raw materials can disrupt the production process, and there will be chain impacts on another process that could result in loss or incurrence of additional costs for a company. Problems often arise in delivery of goods, and error is destruction of unloading. For example, a product is damaged during a process of delivery. The main reason of damage is often caused by a driver who was not disciplined in driving a vehicle. For instance of a driver's bad behavior, he often brakes suddenly or accidentally misses a vehicle on potholes at high speed. This behavior may harm transported goods, as mentioned by the following respondent:

"Time and speed are the first concerned factors for choosing a carrier. Time is very important for transporting goods as no one likes delay that will lead to negatively affect all of supply chain."

(Respondent 10)

Transport service customers are entitled to demand compensation in case of loss or damage to goods caused by faults or negligence of a transportation company. Guarantee legal liability against loss or damage to cargo is in handling or control, in accordance with a contract freight forwarder or international transport convention. The several possible damages such as (a) damage or physical damage to cargo, (b) damage or physical damage to a vessel or third party equipment, (c) continued losses or extra costs (direct consequential loss) as a result of damage to or loss of a and b, (d) errors shipping, cargo delivery and delays due to negligence in running standard operating procedure, (delay, incorrect or wrongful delivery of cargo, failure or omission to follow specific instruction), as well as (e) general average cost (GA) contribution that cannot be obtained from clients (cargo's contributions to general average and salvage which Insured is unable to recover from customers) (Christopher, 2005). The following example presented the respondent's opinion.

"The most important factor is the highest responsibility of companies to be in charge of goods. If any problems or losses occur, companies can handle them professionally, so, this will be more pleasure for us to work together. Transportation service providers must be aware of the potential risks because some kinds of goods have high value and must be handled carefully."

(Respondent 5)

Basically, these research results showed that consumers expect to have products that have beneficial effects on acceptable price levels. A price is a cost to be incurred by a company in a production process, such as how much is basic cost, production cost, delivery cost, etc. Furthermore, determination of selling prices should be considered by several aspects, such as production cost, transportation / shipping, materials, promotions and sales cost (Kotler., 2012) Accordingly, companies required low prices for their production cost, so selling prices of products as well as satisfaction of the end consumers in the market become more competitive. Thirty percent of respondents concerned on price level as the most important criteria.

"Lower prices of services can help a company to save costs and maximize our profits."

(Respondent 4)

"*Price is an important factor that a company has to concern when selecting a carrier because we must reduce cost for a company to maximize profits. Therefore, price is the most important for selecting transportation services providers."*

(Respondent 8)

"*The first factor that is used to determine choices of carriers is reasonable price which means not too high or too low or in the rate that the company has potential to pay."*

(Respondent 9)

"Prices of each carrier will be compared, but usually shipping prices are not much different in the same quality."

(Respondent 11)

"Reasonable prices need to be considered followed by the punctuality and speed to transport goods subsequently."

(Respondent 15)

"Transportation service providers should offer the reasonable price and good quality of services. Normally, the price of each company is slightly different. As a result, we will choose the cheaper one."

(Respondent 16)

Based on the findings, twenty five percent of the respondents were concerned on the importance of good reputations. Reputations of business are essential for its survival. Benefits from good corporate reputations could be found in customer preferences in doing business in the competitive market. Corporate worth and competitive advantages will be increased from positive images of a company, so company should try to build good reputations to sustain these benefits.

"A reputation is an intangible and complex concept but very important in order to achieve business objectives. The reputation of a company relies on words of mouth and networking, so good reputations can benefit a company in many ways such as consumer preferences."

(Respondent 1)

"A positive reputation of a company is valuable as it can be used to add value and support a company in a marketplace. Moreover, a reputation of a company can persuade new customers and lead them to have customer loyalty in the future."

(Respondent 7)

"Credibility, brand image and reputations of a company can guarantee reliability of a company."

(Respondent 12)

"A reputation of a company will support authenticity for taking care of goods. We will feel better if our products are in the hands of the transportation company that has good records and no negative reputation."

(Respondent 18)

"Customers consider prestigious reputations of a company which can be applied to build trust, credibility and offer value to their services."

(Respondent 20)

Moreover, ten percent referred to other criteria for selecting transportation service providers such as the experiences of the companies, the quality of human resources management and their customer services.

"Working experience is the most important factor used to determine a carrier. They must know working process smartly because this will make the work flow smoothly, reduce problems that will occur and save time."

(Respondent 3)

"Human resources management attaches importance as employees contact with customers directly in order to provide services, especially drivers. Therefore, performances of a driver and their driving behaviors are really concerned."

(Respondent 6)

"Customer service care including pre-service, post-service care and customer follow-up is the way to satisfy customers. Good customer services can develop good relationship in long term."

(Respondent 17)

"Good customer services and reliable services will increase the capability of providing services to suit expansion of businesses."

(Respondent 19)

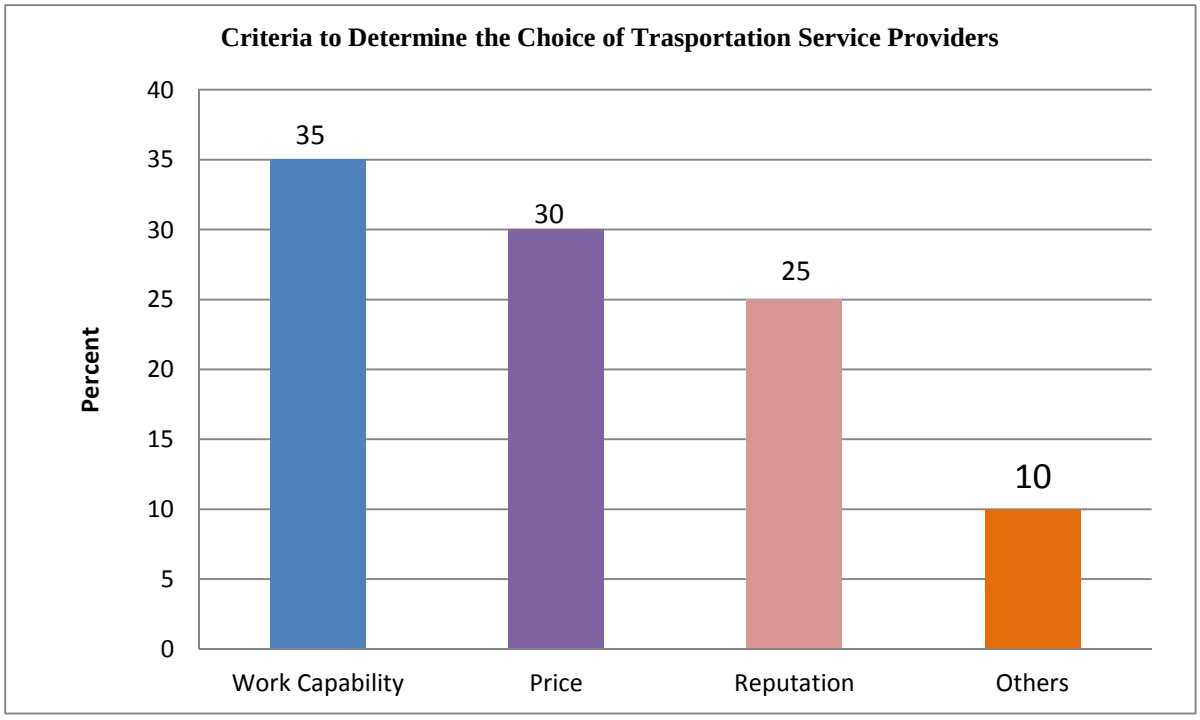

Figure 4.3: The Criteria that Determine the Choice of Transportation Service Providers

Data can be interpreted in Figure 4.3 above. The majority of the respondents (35%) had paid attention to the capability of transportation services provider as the first factor when determining their carriers. The accurate and reliable delivery was the first priority when they made decisions. The second factor that transportation service customers are looking for was better price rates counted as thirty percent. Therefore, prices should be reasonable with productive services. Another major factor for choosing transportation service providers cited by twenty five percent of the respondents was reputations of companies. Other reasons included working experiences, good customer services, and good human resources management.

Interestingly, environmentally friendly service was not one of the factors that customers take into account when deciding on a transportation service provider. Most businesses in transportation sector were being still considered that applications of green transportation are expensive matters and in the contrary to the principles of business that is oriented towards realization of profits. Additionally, the application of green transportation was not necessarily expensive new equipment investment. In fact, implementation of green transportation could be done through operational practices which are efficient and environmentally friendly. Eco-driving, for example, could be one example of the applications of green transportation through applying technique to drive a truck well.

According to the results, transportation performances were primarily dealt with delivery speed and punctuality and capability and also responsiveness, communication, acceptable price, order handling and distribution were covered in the study to measure transportation performances. As presented in the findings, the important factors for customers to choose transportation service providers were the capabilities, especially on working speed, punctuality and problem-solving. Then, prices, reputations of carriers, working experience, and customer follow-up also had affected to customers' buying decision.

4.6 Opinions about International Environmental Standards

It was found that most of the respondents have positive opinions about the environmental standards; however, they thought that these standards may not be effective for all transportation service companies. Some of the following respondents' opinion were presented.

"Many companies try to get the certificated environmental standards by following the requirements strictly at the beginning. However, after that the environmental standards were not practiced forcefully. Therefore, it is not hard to start for being green, but it's hard to keep going green and sustainability in the long term."

(Respondent 1)

"The environmental standards will be successful if many parties are participated in, but much time and resources are needed. In addition, for the company now it is difficult to use environmental standards as a practical guideline even we would like to reduce the negative impacts on the environment."

(Respondent 2)

"In terms of its contents on international environmental standards, I think it is practical and effective. It will be more sustainable if the standards are applied in business processes. However, in my consideration, the international environmental standard certificated is only support the image of the company in the positive ways but does not affect the decisions to choose the carrier."

(Respondent 13)

Companies must pay attention to the environmental management system in order to operate and produce safe and environmentally friendly services. The environmental management system is an integral part of the overall enterprise

management systems containing a set of arrangements that systematically include an organizational structure, responsibilities, procedures, processes and resources in efforts to achieve an environmental policy outlined by a company. To manage the environmental issues, companies must have a standard of references that can be used to perform their environmental management system. One of the environmental standards which is well known and widely mentioned by the respondents was ISO 14001 (International Organization for Standardization).

ISO 14001 is an environmental management system standard which can be applied to any businesses, regardless of sizes, locations or incomes. The purpose of the standard is to reduce environmental damage caused by businesses as well as pollution and waste generated by businesses. Therefore, ISO 14001 offers a guidance for introducing and adopting environmental management systems based on practices aiming to help organizations minimize how their operations negatively affect the environment (Zuo & Li, 2010), as mentioned by the respondents below.

"The environmental standards are OK and accepted worldwide. Many foreign transportation companies are using this environmental standard (ISO 14001) to be a guideline for them in order to improve their environmental performances."

(Respondent 3)

"Many countries have used the standards to define the environmental regulations and laws in order to enforce on import and export activities, so the government support is needed for applying the standards in business process."

(Respondent 12)

"The efficient environmental standard will be led to reduce environmental risks by requiring pollution mitigation decisions. Local ambient conditions will be changed to become better, and many people will also benefit from pollution reduction."

(Respondent 13)

The findings found that economic advantages could be gained from the implementation of the environmental management system. These advantages should be identified in order to demonstrate to stakeholders, especially shareholders, value of companies that have good environmental management. These advantages also provided companies the chances to link environmental objectives and targets with specific financial outcomes, and thus ensured that the resources would be obtained where these resources provided the most benefits both financially and environmentally as presented by the following respondents.

"*The environmental standards are good and supportive, especially in transportation industry that always cause to produce high emissions of gases and pollution to the environment, so if we can do businesses while saving the environment, it will be more sustainable development to save the world and natural resources."*

(Respondent 6)

"*To become environmentally friendly, we need a reference of standard for guidance as it will help to save businesses from environmental damages and enhance economic advantages in the long term as well as reduce energy using and waste."*

(Respondent 10)

Level of Management	**Agree** (No. of people)	**Disagree** (No. of people)	**No comment** (No. of people)
Top Manager	4	-	-
Middle Manager	10	-	-
First line Manager	-	4	2
Percent	70%	20%	10%

Table 4.2: Opinions about International Environmental Standards

The results of opinions about international environment standards were interpreted in Table 4.2. Interestingly, the findings showed that more than half of the respondents from top management and middle management (seventy percent) accepted the international environmental standards such as ISO as supportive tools to reduce environmental impacts from their business process.

Environmental regulations have increased in recent decades such as ISO and National Environmental Policy Act. Without these laws and standards, businesses will do whatever that is the most convenient for them and don't care for the good of society and environment."

(Respondent 15)

"Nowadays, demand for sustainable technology rises, so companies must adapt and follow the environmental regulations and focus on developing sustainable technologies."

(Respondent 16)

On the other hand, only twenty percent of respondents from the group of first line management rejected the environmental standards because they thought that it is difficult to apply in their business as it took time and could increase the cost for their operations, for example;

"The standards may be effective only in theoretical ways, but what's going to happen in reality is different. It is difficult to apply the environmental standards in our businesses as it requires the modification on all of supply chains, and cost may be increased accordingly."

(Respondent 20)

However, only ten percent of respondents from the group of first line management had no ideas and no comments on the environmental standards. Some of them did not express their opinions as they did not know about the standards before. However, they thought that it sounds positive, and might be a good change for transportation industry.

"I have never heard about the environmental international standards. But I think it would be good to limit pollution from transportation activities. Now many people and animals get affected from dirty atmosphere and climate change as the main cause come from transportation, so if there are some ways to solve these problems, the negative effects will be decreased and the world will become better."

(Respondent 8)

To conclude, the top managers and middle managers might receive more updated information and knowledge about the Environmental International Standards, so they had the positive opinions on this matter and would like to support the standards to their management in order to reduce the environmental impacts from their operations. They had seen the benefits from applying the environmental standards in a long term position. Regarding the first line managers' opinions, they were concerned about the environmental issues, but they did not understand clearly about how to implement to the green transportation. Therefore, they did not pay more attention to the importance of the international environmental standards since the standards did not influence on their operations.

4.7 Suggestions for Transportation Industry

In this study, several suggestions were found in order to apply in the future. Moreover, it was found that the government should develop better transportation system and regulations to reduce the environmental issues. In term of the transportation infrastructures, the study indicated that it is not only to increase road

access but also safety. Furthermore, railway system in Thailand was left behind when compared to other countries. These improvements are needed to enable Thai transportation service providers could compete with others countries. Moreover, environmentally friendly concept should be launched as the following respondents' opinions explained that;

"Transportation system and infrastructures in Thailand should be improved which include land, railway, air and water transportation in order to compete with other countries. The improvement will help transportation companies to work easier with more productive.

(Respondent 1)

"Thailand is the second largest vehicle fleets in Asia just after China which is facing serious problems. The problems include congestions, fossil fuel consumption, air pollution and road safety. So, urgent solving is needed for these problems."

(Respondent2)

"The development of waterways and railways must be done. Thailand should have our own effective ports in order to transfer goods, support large sizes vessels and don't have to rely on other neighboring ports."

(Respondent 3)

"Also, rail transportation should be developed to reduce cost for transportation as well as decrease environmental problems. Medium to long distance freight transportation in Thailand should be improved in such a way that would support freight distribution center. Railway infrastructure should be redressed as a main tool to achieve the goal."

(Respondent 14)

"All modes of transportation are one of the factors that every business needs to consider in order to have effective cost of transportation. The effective cost will add value to their logistics system as well as increase the potentiality for competitiveness."

(Respondent 15)

"It is important to encourage international trade and reduce transportation costs to be competitive in the global market."

(Respondent 19)

Regarding the subjects' opinions, the transportation system was one of the most important factors that should be improved by many parties especially Thai government. Therefore, general transportation activities consist of two activities, namely movement activities which are dynamic and the desire storage static. Accordingly, transportation is one important process in the logistics management so if financial resources increase from transportation activities, total logistics cost will also increase subsequently. Transportation costs are occurred due to use of force drivers (driver labors), fuel consumption, vehicle maintenance, capital invested in vehicles and equipment, and administrative activities. In addition to the consumption of financial resources, the risk of loss and damage to products during transport activities, significant costs or losses could be occurred as the following subjects' opinions.

"Road safety is an important matter needed to discuss by participation from every side: both public and private sectors. Unfortunately, Thailand's roads are currently ranked the second most lethal in the world by the World Health Organization."

(Respondent 4)

"Innovative information technology should be implemented in logistics and transportation activities as well as the comprehensive services in order to satisfy customers' requirements."

(Respondent 7)

"Even the government sets a target for reducing fatalities on Thailand's notoriously dangerous roads by limiting the speed and no alcohol drinking, but road safety in Thailand is still weak and needs to be improved seriously."

(Respondent 8)

Forth of all, respondents suggested that protection of the environment is one of the topics frequently discussed, but which is much more difficult to implement in practice. They required the assistance from the government.

"However, the environment is also an important matter that really needs to be concerned because natural surrounding is one of basic elements for living. Rules and regulations must be clear to enforce thoroughly, in terms of the environment."

(Respondent 2)

"The government should develop the related institutions that can provide knowledge and information to entrepreneurs about going green. Moreover, environmental protection measures should be adopted to decrease emissions rate."

(Respondent 6)

"*Substitute energy instead of petro should be implemented for transportation to reduce cost of oil as well as environmental problems.*"

(Respondent 9)

"*The government has responsibilities for protecting people health, welfares and the environment from the risks posed by pollutions. As a result, society will get benefits from the elimination of environmental damages.*"

(Respondent 17)

In addition, environmental management system has a positive relationship with the organizational economic performances and working quality. The survey study was conducted on these benefits. The benefits were expressed in the form of both qualitative and quantitative. The qualitative benefits are improved working condition, better organization in public, improved staff morale, enhanced customer loyalty and satisfaction, establishing or improving brand value, lowered regulatory concerns, increased market opportunities, improved product performances, and decreased liabilities. Whilst the quantitative benefits are categorization cost, reduced waste treatment cost, reduced waste disposal cost, reduced waste storage cost, lowered transportation cost, decreased packaging cost, lowered cost of production, low maintenance cost, and reduced overall cost of organization. Either qualitative or quantitative consists of environmental consideration while a business is running.

"*The news and information about saving the environment should be updated urgently to keep up with the competitors. The entrepreneurs must change the way of doing business in accordance with the environment. Importantly, the environmentally harmful activities must be defined and solved properly.*"

(Respondent 5)

"Government should support inter-modal transportation facilities due to the increasing in cost of transportation and oil."

(Respondent 16)

"A certain level of transportation creates benefits for economic and social development. However, current trends in the transportation sector in ASEAN countries especially in Thailand are unsustainable for the environment and society. Therefore, environmental regulations must be enforced in every business for sustainable development."

(Respondent 18)

"Green transportation and sustainable development are the popular topics that many people around the world pay attention to. This means any kind of transportation that is eco-friendly by using resources efficiently and effectively. However, the development of eco-friendly transportation will be increased."

(Respondent 20)

However, this study revealed several important suggestions on transportation namely, the development of transportation infrastructures, government assistance needs and environmental management. Therefore, the companies should pay attention to selecting the transportation service providers.

Chapter Summary

This chapter concluded that the development of global marketing has remarkable to the development of transportation companies. Transportation system and infrastructures should be developed in general in Thailand. Lastly, the company preferred to choose the transportation service providers providing timely expedition, competitive prices, and responsibilities as well as gaining enough working experience in handling their expeditions. However, these results will be discussed and concluded in the following chapter.

Chapter V

Discussion and Conclusions

In this chapter, the results from the findings are discussed and analyzed with related literature review. The discussion part can be separated into seven themes in line with the research findings. Also, the conclusion of the findings, implications of the study and recommendations based on data analyzed are presented. Some limitations have been identified.

5.1 Discussion

Transportation is an important part of most logistics management and holds one of the major causes of global climate change and emissions. Carbon dioxide (CO2), nitrogen oxide and other greenhouse gases are emitted through the burning of fossil fuels from transportation (Corbett & Winebrake, 2010). Therefore, many international governments and non-profit organizations increase their efforts to address the impacts on climate and reduce the amount of pollutions. Up to 75% of companies' carbon footprints can be from transportation activities. Road and international shipping make transportation's footprints even larger (Gunawan, 2009).

The conventional logistics practices ignoring the environment are inefficient in transportation costs and cause pollutions to the environment (Xia & Wang, 2013). In order to develop a green transportation through transportation service providers, it is important to understand their customers' perspectives and the externalities affecting green initiation. Also, the development of the transportation system in Thailand must be considered in order to fulfill the possible competitions at an international level while environmental impacts are being reduced in order to achieve sustainable development.

5.1.1 Impact from Transportation on Environment

Transportation service providers have played an important role in performing transportation activities, especially in transferring goods for the whole supply chain. There are negative impacts as the side effects of transportation activities, particularly from road transportation. Most respondents in this study used trucks as their main mode of transportation. The finding is consistent with Boundless's (2016) study, which was indicated that road transportation has provided the most negative impacts on the environment. Road transportation has affected the environment negatively as vehicles pollute a lot of emissions such as the burning of oil in transportation of goods from trucks that can cause greenhouse effects (Rodrigue, 2017). These findings, therefore, confirm previous results that impacts from transportation can be separated into three categories: direct impacts, indirect impacts and cumulative impacts (Rodrigue, Bowersox & Calantone, 2005). The results showed that the pollutions from road transportation affected air quality, smog decrease visibility and traffic jams impede quality of life. These effects could be counted as direct impacts. When people inhale these emissions, their health will deteriorate which is an indirect impact. In addition, climate change or global warming is the result of cumulative impacts from transportation. For transportation by ship, construction of harbors would harm natural areas and soil quality as well as pollute high emissions affecting water quality. Forests would be suffered from deforestation and land clearing which influences on biodiversity negatively. However, a carbon output regulation is currently in a form of trade and restricted policies in an international level. Businesses should understand their emissions and measure these amounts first, so they will better prepare to reduce it.

Moreover, the survey results from Antony (2013) were noted that the average percentage of the cost of transportation to sales was 3.24%. Some research had been conducted to reduce a noise level of road and air transport such as researches in engine design, tires, and the aerodynamic profiling of vehicles (Cullinane & Edwards, 2010). Furthermore, it was estimated that cost of logistics is about 14.4% of GDP (2013). Transportation Cost is the majority of Total Logistics Cost (7.4% of GDP).

High transportation costs indicated ineffective management of environmental issues. This is similar to Rodrigue's (2017) research which was found that the lack of consideration of the real costs of transportation may be involved in several environmental issues. The respondents stated about a lot of fuel consuming, lack of route management, bad driving behavior which could lead to the increasing of costs and raise environmental problems. Therefore, environmental responsibility is the matter that the business sector must pay attention to and find solution to solve these problems. Business sectors should show their responsibilities for the problems from their actions as there is a connection between overall transportation practices and environmental responsibilities (Goldsby & Stank, 2000).

5.1.2 Challenges, Trends and Opportunities for Transportation Industry

Based on the results of the study, the most important challenges and opportunities influencing on transportation industry were information technology, economic situations, the development of transportation systems and price competition. Christopher (2005) claimed that global market has been more reachable than ever and competition has been also intense increasing. Therefore, the explicit finding in this study observed that the globalization and accessibility through internet and other new communication channels contributed to more globally spread out customers. People have used internet and technology as a part of their lives, and transportation companies have also applied internet technology in supporting their transport operations to be easier and more convenient. Internet, communication and technology have been applied to create innovation, and these innovation technologies have been expanded widely and rapidly, resulting in effects on the growth of transportation industry. The integration of transport network and improvement of modern information technology system, in addition, could facilitate transportation activities and growing complexity as well as provide lower prices and better services to customers (Gourdin, 2001). Information and communication technology (ICT) is becoming the main driver of change in transportation industry which includes radio-frequency system, bar coding, online tracing of shipment, shipping documents, etc.

Transportation service providers could provide their customers a variety of information via internet and online. These mentioned methods can employed to add value to transport businesses through greater efficiency, eliminate wasted time, quicker responsiveness and information transparency, as well as these kinds of communication will be faster (Evangelista, 2004).

Furthermore, transportation industry has been facing with immense change from economic situations such as trading, exchange rates, export and import activities and politics, etc. In particular, Tipping and Kauschke (2016) pointed out that economic conditions has been changing over time in line with the economic and business cycles, as an economy has improving through expansion and contraction. Decreasing international and domestic trades have created downward pressure on demand for transportation services due to the economic downturn (Nabben, 2014). It is important to note that downturn economy could decrease the growth of transportation industry thanks to lower demand of customers in transportation service. When the customer buys fewer goods, the result is less export and a decrease in the value of the transportation service subsequently. Next, efficient transportation development would be applied to boost the productivity of transportation system in order to compete with other countries. The development should be included in transportation infrastructures in terms of land, water and air transportation. There are some issues that obstruct the transportation development in Thailand and need to improve quickly. For example, existing railway network has not been fully operational yet because of the old railway lines and insufficient locomotives. The complete integration of railways and waterways with road transport or multimodal transport must be developed (Hanaoka & Regmi, 2013). According to the study by Mr.Tanit Sorat, V-Serve group president (2006), the results showed that business, industry and service sectors in Thailand mostly lacked of an understanding of logistics system for reducing cost factors in the business operations. Therefore, in Thailand, the capabilities to reduce cost of transportation comparable to sea and railway transports must be developed, and the benefits associated with coastal and river transportation systems should be considered. Transportation service providers in Thailand also need to upgrade their efficiencies for greater competitiveness.

Moreover, many transportation service providers compete to lower their prices in order to attract more customers, but they cannot retain lower prices in the long term. Therefore, they have to provide better comprehensive services and effective working in order to keep their customers. Quinn (2005) stated that the continuing downward pressure on pricing was the major factor affecting logistics industry in North America and Europe. For Asia-Pacific, the continuous growth of Chinese economy has been majorly concerned. Consequently, the companies could suffer from cutting their prices because they have to work harder in order to get more money back than they lose in cutting price. This result is in accordance with previous finding that providing services at a lower price may be the beginning of a loss cycle. Companies have to cut prices down to compete with others, so profits will be reduced as well, which is the beginning of the loss problem and before they know it, it's too late to get out of (Ellis, 2013).

5.1.3 The Development of Transportation Systems in Thailand

There are currently various types of transportation modes, including air, road and sea transport, to facilitate trade services catering major products (Pomlaktong & Ongkittikul, 2008). The findings of this research were found that the supporting infrastructure and the development of transportation in terms of infrastructures such as roads, railways and ports in Thailand have not been well-developed. There are many issues in transportation policy development. Roads are always mended; railways are underdeveloped; ports still depends on other neighboring countries. Thai transportation system is weak without well-developed planning. According to Sehlleier and Haas (2016), Thailand has got a big potential for its land communication systems: coastal seaports and a multitude of airports. Although, Malaysia and the potential of Singapore seaports and airports are bigger over Thailand, the prospect of Thailand is better for becoming a hub. The results argued that many respondents did not still believe in progress and development of Thai ports as equivalent to other countries. At present, there are many ports in many provinces in Thailand, but there are only a few practicable ports such as Laem Chabang Port and Bangkok Port.

Therefore, Thailand's ports are not well managed to meet the growing demands of customers. Large-sized vessels cannot be docked, so costs will be higher for connecting vessels.

Moreover, this finding demonstrated that rail or train transportation in Thailand are paid much attention. Kunadhamraks (2015) explained that there are five main modes of transportation in Thailand including land transport, water transport, air transportation, pipeline transport, and rail transport. Rail transportation can be used to carry a large amount of goods at a time; cost of this transportation per unit is low; less pollution than road transportation occurs. This type of transportation can lead to save more energy and reduce traffic problems. Most of developed countries used rail transit as their main transportation mode, so their transportation cost is low. The results in the present study provided some evidence that the number of railway transport in Thailand is very low as over eighty percent of the total volume of freight transport is by road. With the use of road transport, the cost of transportation in Thailand is high when compared to developed countries. Nevertheless, double tracks of railway are needed to solve the problem of jamming in different lines. Interestingly, it was indicated in the study that the good point of The Greater Mekong Sub-region (GMS) or international economic corridor will become the center of logistics and goods export and import under the North-South and East-West economic corridor development plan.

Although, road transportation cost is high when compared to other forms of transportation; however, road transport is still the most widely used as the major mode of transportation in Thailand which generates big revenues to the country (Sehlleier & Haas, 2016). This study implied that Thailand should accelerate the improvement of roads for both domestic and international levels in order to handle the increasing number of vehicles due to the opening of ASEAN economic integration which leads to increase the opportunities for trading. In Thai Civil Rights and Investigate Journalism (TCIJ) article by Boodkod (2013) wrote that the volumes of road transportation have grown steadily because its advantages when compared to other nodes of transportation. Road transport has direct access or door to door services because it has regional networks covering the whole country, making it easy to

transport goods to destinations. The finding in this research had expressed the similar view that if the road transport infrastructures such as transport routes, warehouse and distribution center are continually developed, the potential of Thailand transportation system will be increased. If the progress of the transport development project is successful, Thailand will be an effective regional hub, as well as the entrepreneurs will get benefits from this development. Collaboration at all levels, including the public and private sectors and other institutions is indispensable in order to develop an efficient transportation system. Moreover, a good transportation system will lead to better transport efficiency, cost efficiency and greater service quality. However, Thai has a long term target till 2020, such as increasing the railway development, increasing freight proportion by railway, reducing intercity travel by car, four lane highway development, rural road development to support agricultural and tourism, and intermodal facilities development (Kunadhamraks, 2015).

According to Vinayak, Thompson and Tonby (2014), Thailand Ministry of Transportation has a plan to develop Thailand as a hub of trans-regional connectivity in the year 2011-2020. The findings indicated that Thailand should be prepared to cope with this transition. Also, the introduction of AEC is challenging for economic activities in Thailand. The establishment of ASEAN Economic Community (AEC) in 2015 is the regional economic integration in ASEAN which offers great opportunities for 10 ASEAN member states (Kotler, Kartajaya & Huan, 2007). Therefore, this could be explained that transportation sector will be affected by the opening of the AEC as goods and services could be more freely transferred as well as the border trade and investments would be expanded due to the reduction in tariff.

5.1.4 Transportation for Environment and Sustainable Development

The results found that most of respondents agreed on sustainable development for transportation. They understood that green solution would help to reduce environmental impacts from transportation activities. The perception of each respondent varied but focused on environmental protection. These findings, therefore, can confirm previous results stated by Halonen (2016) about green transportation

which helps to build the efficient transportation system while the negative environmental impacts can be decreased. Therefore, environment is a matter that should be paid seriously attention in transportation development. The study results revealed most of respondents stated that environmental concerns are important but only small numbers of them are willing to pay more money on this initiation. They still thought that greening is more complex and costly than saving cost. It can be an extra cost that can decrease the profits of the company. In the survey, eighty percent of the respondents said that they were concerned on environmental care but only small number of them would like to pay more for green alternatives. Everyone supported it as a good idea, but they were still concerned more on profitability (EBSCO, 2011).

According to Rodrigue, Bowersox and Calantone (2005), there is a conflict between the issue of transportation and the environment since transportation does not only provide socioeconomic benefits but also increase negative impacts on the environment. This argument can be disproved by the findings which demonstrated that green transportation can enhance socioeconomic as well as improve environment to become better. Therefore, to encourage the correct green concept for the whole country to achieve an identical goal especially on green strategy, both public and private sectors at all levels must participate in. Everyone needs to be more active in the development of green transportation system. In fact, lean and green can go together as businesses can reduce fuel consumption through more efficient routing, better distribution centers and the innovation of new technologies which can reduce costs and carbon emissions (Anten, Amstel & Verweij, 2014).

In particular, Zhu *et al*. (2007) and Mckinnon (2010) mentioned that environmental management system such as green transportation has positive relationships with the concept of sustainable development emphasized on an integration that benefits all sectors of the economy. Sustainability will be occurred if social, economic and environmental aspects in triple bottom line are linked and combined. These findings provided some evidence that green transportation can make sustainable positive contribution to environment, economy and society through many ways. Fuel efficiency could be obtained by using alternative fuels, applying eco-

driving techniques, and proper maintenance programs. Converting from oil to alternative eco-friendly fuels could raise the ‘greenness’ of transportation as well as decreasing transportation costs. Several alternative fuels including compressed natural gas (CNG) and liquefied natural gas (LNG) were identified to be safer, cleaner and more accessible than diesel. Therefore, poor maintenance program for trucks is one cause of environmental issue. Trucks should be checked frequently to ensure the safety of working condition. Proper maintenance program would help to extend the vehicle lifetime and also minimize the accident rates (Wu and Dunn, 1995). Plus, route optimization means to manage the most efficient route for transportation which will reduce the number of trips and vehicles used as well as spend less time to maximize the efficiency for transportation. Importantly, fleets need to be ensured for fully loaded for both trips without any empty on return. Moreover, transportation companies could be showed their environmental responsibilities by managing the efficient routes for transferring goods. Sbihi and Eglese (2007) pointed out that good route management is achieved when the vehicles are avoided from congestions, which need to be planned in advance to reach the destination faster. This may sometimes mean that the shorter route is not always be the most effective way but the longer route could be more suitable in some matter. This study claimed that business sector had forced to adjust to the concept of green strategy in every business process as the environment is essential factors which influence the future of transportation industry. However, changing into green required the motivation and cooperation by all parties to be succeeded. Going green can not only reduce the impacts on the environment but also stimulate more cost effective and enhance the quality of life for the society.

5.1.5 Criteria in Determine the Choices of Transportation Service Providers

Satisfying customers' demands is an important thing that transportation service providers must look for. According to the study by Anderson, James and Narus (2004) wrote that demand for Business-to-Business market (B2B) is inelastic and fluctuant which are derived demand and fluctuating demand. The customers have more powerful purchasing force in this type of markets. The findings were mentioned

that there were many participants in buying process which comprised of several business buying processes. Moreover, transportation service providers should consider about the influencing factors on business buying behavior in order to fulfill customers' requirements.

Gourdin (2001) said that the companies may not expert in every part of working, especially on transportation, so they outsource specialized company for the purpose to manage the flow of goods in order to reach cost efficiency. An idea of specialization is one of the important drivers for outsourcing because customers would like to obtain the specialized skills from transportation service providers (Bowersox & Closs, 1996). The findings were stated that many companies in this study preferred to outsource in the area of transportation to obtain cost advantages from economies of scale. They can save costs from investment and management in the field that they are not expert. Another study by Boxer and Kerry (2009) showed that the interest in sustainability initiative is primarily come from fuel prices, if oil prices still increase, so transportation service providers have to find away to reduce fuel cost in order to increase their profitability. It can be concluded that transportation service providers in Thailand should offer cost effective delivery services to their customers. Companies can gain cost efficiency from economies of scale since it can reduce cost through larger scale working with many clients.

The results were found that the respondents more focused on the capabilities of service providers and their productive working. Customers require sufficient capacity and specialized skills to serve the expansions of markets and fulfill customers' requirements. The ability to work is what customers consider as a priority in making decisions such as delivery services with safety, stability and reliability. Dweryer and Tanner (2005) had expressed a similar view on the organizational factors which affect buying decision. The services from transportation providers should match with the objectives, policies and procedures of customers in a company. Besides, price is one of the important factors that transportation service customers realize to compare among transport providers. Normally, customers tend to choose a cheaper company to save their costs. This result is similar to the study of Anderson

and Narus (2004) that the economical factors such as prices can influence on customers' buying behavior.

Also, customers will have more confidence and trust to work with the company which has a good reputation and positive image. Reliability in maintaining the condition of goods and retaining the same standard of services are crucial for customers. Transportation service customers need a partner that can give assistance and solve any problems occurring during transportation. This result is in accordance with previous literature that the quality of services can be described as tangibility, reliability, responsiveness, assurance and empathy. Tangibility refers to physical evidence that being perceivable by touch and easily detectable with the senses. Reliability defines as a company's ability to provide accurate and reliable services as promised. Responsiveness refers to a willingness to help and provide fast and accurate services to customers, with clear information delivery. Assurance means a company's ability to foster trust customers to a company. Finally, empathy refers to provide concern to each customer by trying to understand and respond to the desires of consumers (Parasuraman, Zeithaml, & Berry, 1988). In terms of transportation services, quality can be measured as nine indicators pronounced by Mentzer, Flint, and Hult (2001), namely (1) the quality of personnel contact, (2) the availability and ability to service in order release quantities, (3) Efficiency of information provided to customers, (4) easy understanding of ordering process, (5) the accuracy of order matching the needs of customers, (6) order condition related to safety and good packaging, (7) order quality related to how well a product work, product specifications and fulfilling customers' needs, (8) order discrepancy handling, how good discrepancies are in order to address post orders, and (9) timeliness, arrival time or goods as expected.

From the study, adding value through customer services and comprehensive services can be used to create customer loyalty. Pre-sales service, during the sale and after sale service are necessary to maintain a long relationship with customers. The examples for comprehensive services are warehousing, packaging, documentation, distribution centers and inventory functions which provided by one provider. The

wide ranges of these services will support customers' needs and loyalty due to the dependency. Therefore, transportation service providers must have expertise and technical skills in providing those services by having a good partner or alliances which help to increase the capacity and productivity of the services. Hence, cumulative working experience is one of the factors to make customers trust to use the services. It was indicated in the research that improving human resources such as employees is important to develop customers' satisfactions and manage relationships with customers. The quality of employees is necessary matter to concern because they are required to highly interact with customers such as consulting and driving behavior of drivers. This was similar to Thakur (2011) who said that interpersonal factors in buying decision such as preferences, perceptions and attitudes are important for choosing the company. It is important to note that the quality of employees is essential to differentiate the company from competitors. The right people with appropriate skills can reduce problems on working and increase productivity (Trunick, 2006).

Based on the findings, environmental compliance was not very important. Green transportation is not one of the factors that customers use to determine the carriers. Many companies still think that applying green strategy is far beyond their necessity, and now in Thailand, there are just only small numbers of companies applying a green strategy in their management. In fact, the company should pay interest in environmental factors such as the customers' demand, trends, politics and competitions, etc. in order to adjust themselves to meet up with evolving changes (Thakur, 2011). However, being green transportation has more ways than just cutting fuel costs, and there are also many reasons to support and initiate greenness. When fuel costs are cut, emissions can also be reduced, and environment becomes better. Thus, efficient transportation can lead to be green. There are some examples of green transportation which are rerouting, avoiding empty return trucks and reducing idling times (Diamond, 2008). In contrast, green transportation limits the number of shipments, carry larger by slower transport to maximize miles traveled and reduce emissions. Hence, these are tradeoffs that must be addressed. Also, costs to make changes for greener choices are one of the barriers. Railroad is the cleanest way for

transportation in greening consuming less fuel about 75-80% than trucks (Milliken, 2009). However, if customers concern more on environmental protection, a green concept will be driven to businesses because when more attention on environment is paid, businesses are required to adapt green solutions in order to keep customer relations and public relations. Therefore, the demands of customers are the key factors for green success.

On the whole, good transportation services which provide reliable transportation at competitive rates can save more time and prevent some potential problems (Rau & Manton, 2016). Consultative services and communication between customers and transportation providers occurs to understand customers' needs. Transportation service providers need to be more flexible to meet their customers' requirements (Quinn, 2005). Furthermore, transportation service providers need to secure speed and reduce delay problem, so other transportation modes and routes are required to support a service level of commitments (Nabben, 2014). One more important thing, time-based transportation is an ability to reduce in cycle time and lead times in logistics management to delivery materials and goods to the required places at the right time (Carter & Hendrick, 1997).

5.1.6 Opinions about International Environmental Standards

Many organizations turned to apply international standards such as International Standard Organization (ISO) for a guideline in their environmental management. Nebel, Quevedo, Jacobsen, and Helles (2005) reported that an environmental standard is a form of environmental regulations which a company can voluntarily comply with its predefined rules set forth by certification service companies. In this research, the environmental standards for environmental management system have been provided by ISO in order to operate in an environmentally friendly way. According to BSI (2015), ISO 14001 is one of the most popular environmental standards that was indicated about green transportation methods in order to reduce and limit the company's emissions through more efficient use of resources. Most transportation modes usually emit carbon dioxide and

pollutants into the air. (Gunawan, 2009). Quantifying its carbon footprint of a company is the first step to manage the environmental impacts (Corbett, Lack & Winebrake, 2010).

The results were found that seventy percent of the respondents accepted this standard, for it is a supportive tool for doing businesses without damaging the environment. Most of the respondents agreeing with the international environmental standards were top managers and middle managers since they were interested to engage with standardization. However, consumers' priorities could be changed in accordance with general societal trends and expectations, as well as going green was the popular topic which gained a lot of attention. Therefore, they tried to enhance the requirements within the standards because they had the power in decision making to apply green strategy into the operations. They may recognize the green campaign and preferred to initiate green strategy into their business. These findings can be supported by Clark (1999) study which suggested that the company can get several benefits from applying environmental standards such as financial advantages, positive brand image and efficient strategic business goals.

On the other hand, twenty percent of the respondents disagreeing with the environmental standards were first line managers due to the fact that they still thought that applying environmental standard was not necessary and it took time and cost into their products and services. They would be the people who had to be responsible for applying green strategy directly, so they thought going green would overload their working. According to Clark (1999), he stated that ISO 14001 is suitable and acceptable for all types and sizes of organizations. The respondents argued that this kind of environmental management may not be efficient for all transportation companies. Many companies in Thailand cannot apply the standard into their operations due to several barriers such as insufficient information and experiences and lacking of supports. The international environmental standards certificate does not affect decisions on choosing the carriers of the transportation service customers. However, some people thought that the standards might be effective in theory, but difficult to apply in the practical ways, for they do not have insufficient information and experiences to put into practice.

Initially, Sangwan (2011) differentiated the benefits from the application of green standard as qualitative and quantitative. The qualitative benefits will enhance the brand value of the company to be more environmentally friendly which will improve better company's image. Whilst the quantitative benefits are low costs and reduced waste of organization. Either qualitative or quantitative consists of environmental consideration while a business is running. It is consistent to this study which found that applying green transportation can provide many benefits to the company as well as their customers and society.

5.1.7 Suggestions for Transportation Industry

There were several suggestions from many respondents in regard to transportation in Thailand. Transportation system needs to be improved urgently especially on road, railway and ports. Roads, railways and port must be developed to compete with other countries. Thailand own efficient ports should be done, so there is no need to rely on other countries' port for transportation. Railway system needs to be developed in order to help companies to reduce cost and environment problems. Rules and regulations must be clear and enforced thoroughly, in terms of the environment. As Office of the National Economic and Social Development Board (NESDB) (2012), claimed that the growth in trade and services has led to increased use of transportation services, resulting in increased carbon dioxide emissions in the supply chains. Therefore, the explicit correction in this study may be entrepreneurs who must change the way of doing business in accordance with the environment. Moreover, government officials should pay more interest in the transportation infrastructures improvement and the initiation of green strategy.

The poor transportation facilities and infrastructure have impacts on the increasing of transportation cost so that the average transportation cost to the sales will also increase. However, this condition does not mean companies cannot lower this cost because by applying the concept of green transportation, companies will have the opportunity to improve the efficiency of transportation activities, resulting in reducing the total transportation costs of the company and increase more profits. This

is consistent with the study by Sangwan (2011) explained that green transportation can provide many benefits such as improving working condition, better public organization, enhanced customer loyalty, lower costs and reduce environmental impacts.

In summary, all suggestions will be true only when there is a good management strategy which includes not only working within the company but also working within all parties in entire supply chain. This will help to improve the performances and also integrate the all processes and communicating the strategy's value to the organization (Jeremy & Shapiro, 2001). The findings discovered that good cooperation should be done so that everyone can get mutual benefits. A good management strategy should be able to integrate all production and management processes across the company, in addition to those strategies to improve the company's performance. Therefore, the impact of adapting to green transportation performance should be assessed holistically.

5.2 Conclusion

First of all, the conclusion extracted from each theme in findings which can be separated into seven themes. Each theme were related and linked to draw a conclusion. This could be explained that the research had studied about green transportation towards buying behavior from the perspectives of transportation service customers so this research mentioned about the impacts from transportation on the environment and the challenges and opportunities for transportation industry which linked to the barriers and drivers for green development. Transportation system in Thailand was focused as this research aimed to study a case of Southern Thailand. Plus, the research revealed the opinions about green transportation and environmental standards from respondents' perceptions. Nowadays, environmental protection is becoming increasingly popular issue which many people pay more attention to. Business executives should have a clear understanding of the environment as it is a key to success in business management. Many problems arise from misunderstanding of environmental management for business which is difficult to solve. Proper

environmental management will bring many benefits to the businesses. Green transportation is one of the key to solve this problem.

This research was intended to study the influences of green transportation insight from Thai industry through the perceptions of the transportation services' customers in the South of Thailand. Qualitative method which is in-depth interview was implemented for data collection. The purposes of data collection and analysis were to know respondents' perspectives that affect to the readiness of the initiation of green operation in Thailand. In the research, data collection and data analysis occurred simultaneously and were triangulated by primary data and secondary data. Back translation was also applied to ensure the trustworthiness of the study. The purposes of the study were to explore the perceptions and understanding about green transportation as well as to study the challenges and opportunities of green transportation in Thai industry. Moreover, this research aimed to investigate whether or not green transportation has influences on customer buying decisions.

The research questions of this study are:

1) How do transportation services' customers in the South of Thailand perceive in green transportation?

2) What are the challenges and opportunities to apply green transportation in Thailand?

3) How do green transportation have any influences on customers' buying behavior?

Findings to these questions were summarized in the following section. The qualitative study started with the question that related to the environmental problems situation and perceive of transportation services' customers in the South of Thailand. Firstly, this study asked a question "*How do transportation services' customers in the South of Thailand perceive in green transportation?"* The concept of green

transportation is increasing along with the increasing concern for environmental issues. It also forces the industry to adapt the concepts of green transportation in its business. By applying this green transportation strategy, it is expected that there will be an increase in performance from the supply chain. Even though, it is very difficult to give an understanding that supply chain will be more efficient when applying green transportation method (Rodriguez, 2001).

Usually the transportation service customers in Southern Thailand were aware of the direct and indirect environmental effects from transportation but there are no concrete solutions to solve these problems since transportation, especially trucking was a major component in distributing goods to their customers. Although going green was supported as a good solution for environmental protection, in fact, they thought that with the application of green transportation would increase the additional costs and beyond their necessity to waste time and expenses for green initiation. In essence, conventional transportation practices intended to increase vehicles mobility and ignored the environmental impacts which were inefficiency in transportation costs. The poor transportation facilities and deficient management had an impact on the increasing of transportation cost so that the average transportation cost to the sales would also increase. Most of vehicles are based on the internal combustion engine which powered by oils and pollutes high emissions. All respondents known that road transportation has the adverse effects on the environment such as carbon dioxide emissions, greenhouse gas emissions, smog, etc. However, transport optimization could be done in conjunction with reducing environmental problems for creating healthier and more fuel-efficient transportation systems.

Presently, environmental issues and customers' concern for the environment are increasing, this is what drives the industry to change its business processes to be more environmentally friendly than conventional business processes, which later evolved into the green management. According to Denisaa and Zdenka (2015), it was found that small and medium-sized companies in Slovakia agree with efforts to follow green transportation ways of delivering goods from one place to another, in addition

they used eco-driving techniques in order to save energy and accident rates. The lowest numbers of respondents understand green transportation as Denisaa and Zdenka (2015) stated that business management must pay attention to environmental quality. A number of efforts to be more environmentally friendly are by way of transportation management such as by way of route optimization and other efforts that is to cooperate between stakeholders in supply chain. The actual performance improvement could be seen from the lack of external problems that incur additional costs. For example, one strategy of a green transportation is by reducing empty backhaul trucks and wastes while saving energy and oil. Not only that, the application of green transportation also associated with savings on factors related to cost, time, reliability and information technology. Increasing levels of public awareness of the earth's natural resources, environmental and cultural preservation encouraged many parties to participate in the green initiative and also convinced the companies to apply green transportation in order to match the needs of the customers. Moreover, transportation company should also train their employees to realize the importance of green transportation and apply green solution into their actions. However, this kind of training is rarely done by the company.

Conversely, the results of the study found that most respondents are aware of the environmental problems caused by transportation, but they have not paid much attention to solving these environmental problems. They continued to focus on the profitability they could receive. They tried to reduce costs especially transportation cost so additional cost for changing into green transportation was really concerned. They didn’t think about the long term results for applying green transportation because they didn’t sure for actual benefits received from green application which will be effective or not. It could be said that the awareness of green transportation has not yet been formed widely. Moreover, the findings shown that green transportation is still a new topic in Thailand for both transportation service customers and providers. Lacking of knowledge and expert skills were one of the barriers that make green value is not so widely accepted in Thailand. Importantly, the government support would be a driving force that influences the customers and transportation service providers to adopt eco-friendly transportation. Hence, Clem (2008) added that going green reflects

the social consciousness about protecting the world's natural resources from ever-increasing civilization. Increased demand for environmentally friendly products and services is due to the fact that customers are more aware of the current environmental problems and its impacts. This has resulted in the requirement for business sector to be more environmentally responsible. In recent decades, business firms have created and implemented better strategies in line with best interests to protect the environment. The conventional transportation activities could cause pollutions, wastes, and other hazards to the environment. To overcome the occurrence of pollution, waste, and other hazards to the environment due to the impact of activities in the transportation (as a part of logistics), it is now being promoted green transportation.

However, this condition does not mean the company cannot lower its transportation costs, because by applying the concept of green transportation then the company will have the opportunity to improve the efficiency of transportation activities thereby reducing the total transportation costs of the company. The application of green transportation involves the interconnection of many parties. For road transportation, for example, related parties include truck manufacturers (fleet manufacturers), Ministry of Industry (motor vehicle design), Ministry of Transport (type and test of periodic exhaust emissions of motor vehicles), Ministry of Environment (emission threshold Exhaust gas), Ministry of Energy (fuel specification development), Oil Company (production and distribution of fuel), and Police (law enforcement). Owners of goods (manufacturers and retailers) also become parties that play a role to encourage the implementation of green transportation. Green transportation can provide many benefits such as improving working condition, better public organization, enhanced customer loyalty, lower costs and reduce environmental impacts (Sangwan, 2011). Transportation continues to be a growth industry. At an international level, the trend of transportation has changed as many customers prefer to use green products and services that are more sustainable and environmental friendly. People try to minimize the environmental issues. For these reasons, transportation service providers and importantly customer should more

taking into consideration about environmental sustainability (Perotti, Zorzini, Cagno and Micheli, 2012).

The second research question asked about "*the challenges and opportunities of applying green transportation in Thailand*". Thailand's dramatic transport growth has caused numerous environmental problems. Therefore, green strategy is introduced and used as the effective solutions in order to solve the environmental problems in many countries. Unfortunately, green transportation in Thailand is not getting enough attention that can force transportation service providers to initiate green practices. The implementation of a good green transportation strategy involved not only working with suppliers to improve their performance, but also related to various aspects of managing resources and communicating their values to all members of the organization (Wallerius & Zakrisson, 2010). A study in the electronic company in Thailand resulted that the consideration about the environmental issue in the transportation activity was low. Even though the electronic company concern in the current environmental problems around the world but they still do not see the benefits of changing to be green. But due to the demand of the USA and European country to the friendly environmental manufactured thus this has driven the electronic company to comply the green manufactured and transportation (Wallerius & Zakrisson, 2010).

This research resulted that the challenges of applying green transportation strategy are the problem of financial deficiency in the company which come from poor economic situation and fierce price competition. Economic situation directly affected the profitability and cost of the company. When the economy is down, people will save and be cautious of spending more money. Exports are expected to decrease due to decreasing of customer demand, resulting in lower costs for the company to generate more profits. If the application of green transportation would increase the extra costs so many companies were not interested in this investment. In addition, the price competition was increasing. Many transportation companies and new comers in this industry were trying to lower price to attract more customers, resulting in losing profits as the companies couldn't retain at low price rate for long time. From this point, most of companies didn't want to bear the higher cost and unstable risks from

initiating green transportation. Plus, there are few number of green transportation company in Thailand so this green solution is unpopular. By and large, green demand should start from the customer first. Presently, Thai industry starts to understand and respond to customer needs but they have not paid much attention to the green requirements.

The results of the study about the opportunities to apply green transportation in Thailand indicated that the development of the transportation system in a better way is needed. If transportation system has been improved, the implementation of green transportation would be easier, as transportation service customers would have more options to use other modes of transportation which provide more energy-saving, cost-effective and least environmental impacts. Moreover, the internet and technology (IT) had opened up the business world to make trading more profitable and more convenient. IT facilitated the effectiveness of transportation activities and reduced the use of natural resources as well. Environmental problems would be decreased from using of internet and technology, for example, e-custom, GPS, online map and social network. In addition, education and servants of the application of green transportation should also involve employees. Clerks should receive education or training so that employees can be ascertained by applying such a green transportation process. This is important because the employees must have a way of thinking that supports green transportation, for example, in the selection of appropriate suppliers to the environment, positioning of effective production equipment within the company, environmentally friendly transportation, recording emissions data and energy consumption, reducing the number of packaging or working with customers, who are concerning on environmental protection, and costs associated with transportation could be saved, and loss of customers, which each company encounters (Wallerius & Zakrisson, 2010).

The third research question asked, *"How do green transportation have any influences on transportation service customers' buying behavior?"* Seeing the problems that threaten the sustainability of the environment, of course, more people are required to have a sustainable consumption patterns or can be said consumers can

guarantee the fulfillment of its needs do not harm the environment. One alternative to sustainable consumption pattern is by consuming environmentally friendly product and services including using green transportation. The level of environmental awareness has an impact on consumer behavior and demand for environmentally friendly products and services. There are several factors that influence customers in relation to green transportation, for example, business experience, environmental knowledge, availability of environmentally friendly products (Fransson & Gorling, 1999). As Polonsky (2011) articulated that some consumers have started paying attention to environmental issues when they buy a product. However, sometimes there are some consumers who are too excessive in receiving information about environmental issues. Consumer awareness of environmental issues as well as environmental friendly values and norms are factors that encourage consumers to purchase environmentally friendly products (Asikainen, 2000).

This study articulated that the transportation service customers seriously concerned about the capabilities of the transportation service providers such as the punctuality of delivery and the handling responsibility. The results mentioned that reasonable price and good reputation of the company are important factors while choosing the transportation company. Other factors such as experiences and good quality of employees were also used in the decision making. Consequently, the customers still did not consider about using a green transportation strategy. Similarly, research by Large, Kramer and Hartmann (2013) suggested that early stimulation of operations to use green transportation has little effect on subsequent practices. Furthermore, the results of the Wolf and Seuring (2010) paper indicated that buyer purchase decisions are still only based on common criteria such as price, quality and on-time delivery. Although currently transportation service providers have sought to provide eco-friendly services.

There are the same characteristics of customer service between marketing and transportation activities. Customer satisfaction for transportation activities can be achieved by transferring the products to the right place in the right time and in good condition (Emerson & Grimm, 1996). Similarly, Rushton, Croucher, and Baker (2010) explained that there are many ways to classify the components of customer

service for transportation management. Hence, the seven ‘rights’ of customer service can be regarded as the main components of transportation service. These seven ‘rights’ of customer service include the ‘right’ in quantity, cost, product, customer, time, place, and condition. Grant (2012); Grant, Juntunen, Juga and Juntunen (2014) stated that transportation activities is a form of services that needs to response to customers’ requirements. Customer service is considered as the important part of transportation processes which should be taken care of. Furthermore, the shared variables between transportation mix variables and marketing mix variables are people, processes, places of sale, peer, planning and control. However, there are ten transportation mix variables which related to intangibility and these variables are similar to the marketing mix variables. Thus, it can be concluded that transportation activities act as services (Grant, 2012).

Green attitude for environmental responsibility from everyone could motivate more environmentally friendly buying behaviors (Kotler *et al.,* 2009). This study explained that there are green supports from the government sector in order to motivate green awareness of people. Chen and Chai (2010) claimed that the realization of environmental issues has resulted in the greener attitudes, particularly on consumers’ behaviors which turned to prefer more environmentally friendly services. This increased attention and responsibility which has enhanced the growth in environment-friendly services worldwide (Hunt & Dorfman, 2009).

As things considered, this research explored green transportation through the perspectives of transportation service customers in Southern Thailand which revealed that green transportation could add the extra cost in initiating so they thought it was a waste of money and not necessary to do that. Economic situation and price competition were the challenges for applying green transportation while opportunities of green transportation in Thai industry were the development of transportation system and internet and technology. Also, the study investigated that green transportation solution was not one of the criteria that affect buying selection of transportation service providers. As a result, the demands from transportation service customers could affect the performance of transportation service providers**.**

5.3 Research Implications

This study endeavored to understand the perspectives of customer of transportation service providers toward the green transportation policy. After discussing the findings, accordingly this section described the implications of the finding. This study revealed some important findings which might have implications either for the academic or practical purposes. The implications as follow:

Firstly, most of research subject was understand about green transportation strategy, but it was difficult for them to influence a transport service company to follow the green policy. Some of subject stated that green strategy is expensive and may impact to their revenues and profits. In accordance, the government should make intervention in order to scale up the practice of green transportation strategy. Secondly, regarding to the development of internet technology, transportation service providers could gain advantages to implement the internet technology to support their operation such as e-custom. By using the internet technology, it was expected that the transport operation will become more efficient. Thirdly, it was found that land transportation system is weak especially on roads and railway. Fourthly, most of the respondent articulated that the timeliness and the guarantee of delivery are the reason of customer to choose transportation service providers. It implied that transportation service providers should develop themselves to gain advantage from the market. In addition, a competitive price was a must to attract customers to choose the company. Then, the foreign transportation services had been infiltrated the domestic transportation market, thus the local transportation company should develop their service in order to compete with international company.

In addition, customer pressures and top management decisions are one of the key factors driving companies to use green strategy. Thus, companies maintain relationships with old customers and gain new customers who pay attention to environmental aspects. Plus, the influence of top management influences the acceptance of green strategy among internal companies. However, the results found that there are inhibiting factors in the application of green transportation. The most influential barriers were the economic factors and the internal financial state of the firm. But the customer aspect could also be a barrier for companies in applying green

strategy. For example, customers do not want to pay higher costs as a result of the application of green strategy. On the other hand, there is a need for an approach to the company so that they want to apply green strategy. One of the advantages of the marketing side of green transportation is the added value for companies labeled eco-friendly companies. This labeling could be drawn its own attention to the company.

In the application of green transportation, the companies should analyze their internal and external factors. External analysis can be done by looking at customer needs. Thus, the company will have information about their customer needs regarding the application of green transportation. Internal analysis will provide information in the development of green services. New services can be developed in accordance with the capabilities of the company. From the internal and external analysis, it can be developed a service or product that sustain with customer needs but in accordance with the ability of the company. Furthermore, the company should also think of ways to apply green strategy on products or services offered. As a study articulated that in order to apply green transportation, companies must follow the basic principles set forth in the existing clauses such as ISO 14001 that manage the environmental management system. Thus, companies should develop procedures that concentrate on operating analysis, continuous improvement, measurement and target, and objectives.

However, the company should make calculations for the implementation of costs as a result of the application of green transportation. Costs incurred as a result of the application of green transportation should not cause the price of goods or services to be expensive and cannot compete with other products or services. Another thing to be prepared is not only related to pricing and cost, but companies should pay attention to human resource development so that they can also adapt to the policy of green implementation. Companies should send employees on training or seminars related to green strategies. As many scholars articulated that the most important factor in the organization is human resources (HR). By having adequate human resources, a transportation company can provide the best quality, survive and excel in the competition (Liao, 2011).

Moreover, the recommendations that could add to the practical applications are included in this part. Firstly, the development of land transportation system is a

compulsory option in order to support transportation business to transfer goods from one point to another. Secondly, a policy of transportation company in implementing green strategy in their services should be launched. Climate change issues need to be resolved and dealt with urgently as well as fostering the cooperation in order to improve and enhance environmental issues as well as energy efficiency. Thirdly, transportation system plans should be improved along with promoting environmental-friendly transport at the same time. Multimodal transportation chain should implement to reduce in-effective route, for example using railway and also truck. Fourthly, green transportation activities such as switching to use alternative fuels, applying eco-driving techniques, and proper vehicle checkup programs all are help to increase energy saving. Green transportation can be started simply by switching to more efficient eco-friendly fuels. Next, developing environmental education course at all education levels can enhance more understanding about how important of environmental protection. Lastly, motivating by using specific instruments such as green certificates to increase more attention for environmental protection and emission tax should be given special attention. The corporate environmental reporting including all sized enterprises should be promoted.

5.4 Research Limitations

This analysis had concentrated on qualitative research which interview was a research instrument. There were certain relevant limitations from qualitative research. Although, the interview could provide descriptive explanation and details, it heavily depended on the individual skills of the researcher and the biases and idiosyncrasies were easily occurring by the researcher as well. The researcher had to be more objective because the qualitative data was not well understood and accepted as quantitative data which provides more scientific results. This type of research required information from many participants which have different opinions. Therefore, the samples in qualitative research must be large enough to provide important and necessary information to answer research questions. At the same time, if the sample size is too large, the data will be duplicated. Rigor is more difficult to maintain, assess,

and demonstrate. As this qualitative research took quite a lot of time to collect and analyze data.

Also, findings could be more difficult to characterize in a visual way. The results from qualitative research would be interpreted in the form of description which no actual number of statistics as similar in quantitative research. Moreover, due to the time factor, data collection and data analysis took more time consuming to proceed. Thus, this research used face to face interview and telephone interview which have both advantages and disadvantages.

Face-to-face interview or in-person interview is a popular data collection method in qualitative research because this method helps to screen the false information by screening questions as well as capture verbal and non-verbal cues which including body language. These non-verbal cues in this study could show as the feeling of the interviewees such as the level of discomfort and enthusiasm. In addition, face-to-face interview could keep focus and control over the interview as the interviewer and interviewee were presence during data gathering. On the other hands, face-to-face interview took high personnel cost and the sample size would be limited by the area of interviews.

For telephone interview, this method is time and cost effective as well as it can access to wide geographic area. For this study, the interviewer and the interviewee could settle free time to make an interview and could prepare other information in advanced in order to answer the questions. However, the interviewers had less control over phone interviews because we couldn’t see people’s reactions, facial expression and gestures. The reduction of social cues was one of disadvantages for telephone interview. Although, social cues such as voice and intonation were still available, body language couldn’t be used as a source of extra information. Importantly, the interviewers had to make sure that the interviewees were free for interview at that time and should be careful with technological distractions. Nevertheless, the advanced technologies at these present days provide more convenient for communication in the distant areas, for example, skype, face time, line call and conference call. Therefore, these applications were effective and could reduce some problems of telephone

interview for this study. Hence, most interviews were limited to thirty to forty five minutes so the questions and answers would relatively brief and complex questions were avoided.

5.5 Recommendations for Further Study

This study would like to give some important recommendations that may elaborate for further study. The recommendations are firstly, the subject of study should be drawn from business owners of the transportation companies. So, the study can measure the knowledge, attitude and practice of the transportation service providers toward green transportation strategy. Secondly, quantitative study should be incorporated with qualitative study in future research. The study should derive from the perspectives of transportation service providers' side as well as their customers. Plus, the research should study the drivers and barriers for introducing green transportation in Thailand. Thirdly, further studies should include other theories that related to green logistics to frame the research broadly, for example, the reverse logistics and waste management or study about green transportation in other industries. Next, there are few studies that have addressed the ecological effects of transportation which generally addresses on local to intermediate scales. Most studies have done based on small sampling and insufficient sampling of the range of variability in ecological systems. The sample size in this study came from only in the South of Thailand. Surveying the other parts in Thailand to gain more comprehensive understanding of the issues could further strengthen the transferability of the study findings. Then, the additional research would be taking a real green case study approach to explore more in-depth understanding of how to initiate green system in Thailand.

From this research, it was found that there are few legal incentives or disincentives to consider the environmental effects. More attention should be paid to planning, managing and assessing the impacts of transportation on the environment. Environmental friendly innovations should be promoted through the use of green services while green labeling should be involved in business sector. The integration of

ecological goals should be included in transportation in order to provide guidance for future environmental protection. Therefore, environmental concerns should be given priority attention from all sides which include federal, state, nongovernmental organization and firms involved in initiating green management. Moreover, when Thailand is more open to international trade and foreign investment, we have to pay more attention to international standards which now environment topic is increasingly important. Thailand needs to strengthen its efforts on environmental management as well as enforce the environmental management systems in businesses to support the international environmental cooperation.

In closing, this research consisted of five chapters. Chapter one was including background, problem statement, purposes and questions of the study. Related theories were presented in chapter two, literature review. Systematic plan for doing research could be explained in chapter three, research methodology. The results of the research were reported in chapter four, findings. Then, all findings were discussed and concluded in the last chapter five which is discussion and conclusion. However, this research was conducted to study the feasibility of the green transportation in Southern Thailand from the perspective of the transportation service customers which can be used for further researches. This research may be useful to those involved in transportation industry such as transportation service providers, transportation service customers and public sector and even the consumers in order to find the solutions for the application of green transportation.

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Appendix A

Respondents Grid

Respondents Name	Respondents Position	Company	Years of Experience	Interview Type	Date and Duration
Respondent 1	Supervisor	Company A	8	Telephone Interview	April, 2017
Respondent 2	Supervisor	Company B	8	Face-to-Face Interview	April, 2017
Respondent 3	Supervisor	Company C	7	Telephone Interview	April, 2017
Respondent 4	Supervisor	Company D	9	Telephone Interview	April, 2017
Respondent 5	General Manager	Company E	15	Face-to-Face Interview	May, 2017
Respondent 6	President	Company F	28	Face-to-Face Interview	May, 2017
Respondent 7	Branch Manager	Company G	12	Telephone Interview	May, 2017
Respondent 8	General Manager	Company H	10	Face-to-Face Interview	May, 2017
Respondent 9	General Manager	Company I	7.5	Telephone Interview	May, 2017
Respondent 10	President	Company J	20	Telephone Interview	May, 2017

Respondent 11	Supervisor	Company K	9.5	Telephone Interview	May, 2017
Respondent 12	Supervisor	Company L	4.5	Telephone Interview	May, 2017
Respondent 13	Department Manager	Company M	14	Face-to-Face Interview	May, 2017
Respondent 14	General Manager	Company N	10	Telephone Interview	June, 2017
Respondent 15	Vice President	Company O	10	Face-to-Face Interview	June, 2017
Respondent 16	Department Manager	Company P	9	Telephone Interview	June, 2017
Respondent 17	Department Manager	Company Q	8	Face-to-Face Interview	June, 2017
Respondent 18	Branch Manager	Company R	12	Telephone Interview	June, 2017
Respondent 19	CEO	Company S	24	Face-to-Face Interview	June, 2017
Respondent 20	General Manager	Company T	7	Face-to-Face Interview	June, 2017

Appendix B

Company Background

Company A

Company A is the limited partnership company that selling latex. The company is located at Nakhon Si Thammarat, Southern Thailand. This company is small sized company with about 50 employees. The company has been exporting the quality rubber and latex worldwide and they have committed themselves to maintain the good quality and services to every customer all over the world. They usually use truck transportation services in order to transport the goods to the vessel at Malaysia in order to export worldwide. This company also produces block rubber such as STR 5L, Skim Rubber Block etc. For the company, their biggest asset is the customer's trust in their product and invaluable skilled human resources. Their customers are basically from glove, condom, foam, mattress, rubber thread and glue manufacturers in almost 50 countries from all continents. They have been supplying custom latex concentrate and rubber block with their technical expertise to meet the product requirement. Moreover, the company believes that taking care of environment and community in the neighborhood equally important with the quality of product. Pollution control systems developed in the factory became a model for all latex producers in Thailand. However, the company also conducts various community development programs for the benefit of local people.

Company B

Company B is registered as a corporation on February 22, 1954, the head office is located at Hat Yai, Songkhla Province, with approximately 40 employees in this office. The company manufactures and distributes natural and technically specified rubber to overseas. It owns five rubber processing factories that produce 200,000 tons of technically specified rubber a year. The company was incorporated in 1954 and is based in Songkhla, Thailand. The company's vision is to be harmonious. It has the potential to develop and innovate, which is based on the dedication of the staff, always develops their potential to provide customers with the highest quality

products. The company uses many modes of transportation including by truck, by rail and by vessel. They usually export their products through Sadao custom and Padang Besar custom. This is a large company with more than 300 employees. Currently, this is also the largest exporter of rubber in Thailand. The average export volume is 1.9 million tons / year, accounting for about 15% of total Thai rubber export volume.

Company C

Company C was established in 1980 at Chandee, Chawang, Nakhon Si Thammarat. The province was named as the best quality rubber in the country. The purpose is to produce smoked rubber sheets with high quality in order to export to both domestic and foreign customers. Moreover, the company is under the ISO 9001: 2008 quality manufacturing process. The company is in approved list from leading tire manufacturers around the world in appreciation for exceptional quality in natural rubber shipments, such as Bridgestone, Michelin, Goodyear, Sumitomo, Nexen Tire, Hankook Tire and more. They are also a member of Thai Rubber Matchmaking Association No. 54. With over 30 years of experience, their products are recognized in the leading rubber market. Currently, the company manufactures smoked sheet rubber over 3,000 tons per month to export by using truck transportation with grade A container. Rubber smoked sheets can be classified into 5 grades: RSS1, RSS2, RSS3, RSS4, RSS5 according to the purity standard, color flexibility, etc. This is a small size factory with about 50 employees which the owner takes care of every step, making the products come out of reliable quality.

Company D

Company D was founded in 1986 by two founders which starting with the oil palm plantation business. Then, the company has expanded its business to agricultural products transformation (palm oil), transportation and alternative energy which require being one of people who help to promote the economic growth and increase Thailand competitiveness in world’s trade. The company holds the area of 4,500 Rai in Surat Thani, Thailand. The location is at Thachang, Suratthani, Thailand. Now, the company maintains operations and head office in Surat Thani, a southern province of

Thailand, which is surrounded by rubber plantations. The company generates approximately 80 percent of its total revenues from exports. Two main products for exporting to the international market are concentrated latex 60% and skim block. The company guarantees premium-quality products and on-time delivery according to customer requirements. There are 400 employees in the company which is the large sized company.

Company E

Company E was started the business on 10 September, 2000 with 200 million baht registered capital. Share percentage included 59% of Malaysia representative, 25% of Thailand representative and 16% of China representative. The company manufactures and export rubber products, for example, natural rubber STR10, STR20, STRxL, STR CV and mixtures rubber packing in shrink wrapped and crated pallet. The production capacity is about 45,000 MT per year to worldwide market. This company is specialized in rubber manufacture as they strictly control the production line starting from selecting the best raw material with modern technology to keep the high standard of exportation. The office is located at Hatyai, Songkhla. The factory is located at Thungyai, Nakorn Si Tammarat. Total employees in the company are about 140 people. Normally, the company uses truck transportation service provider to export their products through Sadao boarder.

Company F

Company F was founded in 1987-1988 which located at Thanumtip, Betong, Yala with the area of 12 Rai surrounded with rubber plantations. Firstly, the group was founded by 65 people which operated by the administrative committee. Almost members are orchardists and farmers. The vision of the company is “The Company is established for all members for the purposes of improve the quality of live and develop to the advancement”. The group received budget from Yala Provincial Administrative Organization to build the quality rubber sheet factory. Then, they try to improve tire quality and selling tires in Betong market. The price is higher than the

local price so many people are interested in joining the group. Currently, the group has more than 486 members with 12 agricultural units.

Company G

Company G was founded in 2006 and established upon obtaining the approval from the People Republic of China's Ministry of Commerce and Thailand's Ministry of Commerce. The establishment was the investment of China's Guangdong Agribusiness Group Corporation, located in Kuankalong, Satun and Trang Southern Thailand. The production facilities and technical expertise are provided by the Malaysia company capitalized on its internationally recognized reputation and leadership in the rubber industry. This company is a famous organization in the rubber products manufacturers industry located in Thailand. Currently, the factory is running on 4 major production lines, namely STR-5L, STR-10, STR-20, RSS 3, CPR, and etc., with an annual production capacity exceeds 100,000 MT. This private company was operated about nine years ago. The company's mission is to provide a high quality product through the use of the latest technology, research and development. While position itself competitively in the global market, it constantly undertake new challenges that evolve with time and market needs. It also built on a mission of good team spirit and smart partnership with its associates to improve, explore and be a market leader in the rubber product industry. The company is small sized company with about 80 employees.

Company H

Company H is the world leading fully integrated natural rubber processing company. The company established in 1987 with a market share of 12% of global natural rubber consumption. They have operations in every sector of the natural rubber industry, from rubber plantations and rubber processing to the manufacture of medical examination gloves. They produce a complete range of natural rubber products, from Technically Specified Rubber (TSR) and Ribbed Smoked Sheets (RSS) to Concentrated Latex. They have 35 production facilities that are located in Thailand, Indonesia and Myanmar. Together they have a total production capacity of

2.4 million tons per year. The vision of the company is “passionately, we drive possibilities”. Also, the company is operated under green concept rubber company which they are committed to an environmentally sound approach to production, through which they strive to inspire satisfaction and confidence in their customers and suppliers alike. Moreover, they are committed to minimizing the social and environmental impact of their operations and to the sustainable consumption of natural resources. STA is the first and the only Thai rubber company that is dually listed on both the Stock Exchange of Thailand and on the Singapore Exchange (SGX). The company is committed to growing in lockstep with the economic development of the local communities and of Thailand. In the downstream sector, The company is Thailand’s largest and world’s top five manufacturers of medical examination gloves with the rubber plantations that are located in many provinces of Thailand. As of today, the casualties from the rubber industry continue to pile up and no relief is at sight for some time to go. To survive, the company has been prepared well since 2011, they have been working on cost cutting, productivity, HR matters, marketing and sales and technology and improvement on management. These continual improvements in all areas have made the company strong and efficient and the key success of our company. The Hatyai branch of this company was established in 1987 to produce and export RSSs. It occupies a plot of land with an approximate area of 50 rai.

Company I

Company I is one of the export businesses that are very popular and supported by the government. Therefore, the company founder sees the importance of rubber wood exporting so he tried to distribute and export the rubber wood aboard. The company was established in 2004. The company is a trader which exporting rubber wood processing by buying woods from many factories in the South of Thailand especially in Suratthani. The office is located in Phra Nakhon, Bangkok. This company is using only one transport service providers to load the rubber woods at many factories in Southern Thailand. The company is a small-sized enterprise with about 20 employees. The mission of the company is to export rubber wood from the

manufacturers to their customers quickly and accurately to satisfy customers' need in order to stimulate sales and maximize more profits. The company has set a goal within 5 years to be one of the leaders in Thailand's rubber wood exporters.

Company J

Company J is a manufacturer of the rough sawn rubber wood, housing components, furniture parts and papers that serve both domestic and export markets. With more than 10 years of experience, the companies are constantly improving both technologically and in human resources. The company was founded in 1995. The company produces finger joint, butt join, laminated boards as furniture parts and housing components and parts. Raw materials used are rubber wood, oak and others. It has a capacity of 450 cubic meters per month. At present, the group consists of the many companies located in Trang Province and Songkhla Province. The official office is located at Huai Yod District, Trang Province. This is large sized company with more than 200 employees from all branches. The company provides service and consultation to the companies in the group. Since the beginning, the companies have been emphasizing on the development in technology, human resources and management system so as to allow a stable and consistent growth as well as a happy family-like organization. Their vision is to become the leader in the industry, in production, quality, and quantity and to be certified with ISO 9001:2008. They are determined to improve the production process, train up our personals to reach their maximum potential and produce high quality products to the satisfaction of their customers. Customers' satisfactory is a key element that contributes in the success of the company.

Company K

Company K was founded in 2005. This company is the manufacturer of rubber wood processing and export worldwide. The company is working within the logging and sawmills industry. The company address is in Satun, Thailand. It generates $7 million in annual revenue. Firstly, this company was established as sawmill for export to domestic wood processing plants. In 2016, the company expanded itself into a

rubber wood processing plant in order to export to overseas markets which China is the main customer group. The mission of the company is to continually improve the quality of our organization to meet the diverse needs of our customers and to develop the new products to ensure the customers will be satisfied. The vision of the company is growing along the readiness of the organization. However, the objectives of the company are creating the security for employees in the organization and creating more markets. At present days, the company employs a total of 680 employees which is considered as a large sized business. The company uses 40 feet high cube containers to load their woods then transport by trucks to turn the laden at Penang port in order to export by vessel.

Company L

Company L started business in 1993 and its main production line is dried transformable parawood to supply to the furniture industry. Their products can be used on all household furniture and office products. Their main export market is China. The company is located at Hat Yai, Songkhla. This is the large sized company with 700 employees. The company will buy quality wood that is suitable to make transformable wood and the company has team to find raw material by itself. Because the company is near raw material place, so they are confident that they will not lack raw material for production. When they got quality raw material, they brought it to transform another size after that it will be enameled to protect weevils and insects and fumigated to become quality wood as follows demand of market. In the present, the company has export market such as China, Malaysia and they will be confident with quality and the company is making ISO. They plan to extend the production of rubber wood palette to catch in logistics that has benefit to execute and manage factory and the company.

Company M

Company M was founded in 1982. The company is working within the rubber product manufacturing for mechanical use industry. The office address is in Nakhon Si Thammarat, Thailand. Firstly, the company is the factory that manufactures and

sell the rubber wood in front of the factory. Presently, the company runs a business about the production and sells processing rubber wood and drying wood with the customers in and outside the country by using the machines and modern technology. Their goods receive the believability and are accepted admit from a customer widely about the good quality of the products. The company is small sized with about 50 employees. Their products can separated into 4 grade which are rough sawn, chemical-treated and kiln-dried rubber wood AB grade, C grade, P grade and BC grade. Products are widely trusted and accepted by customers as consistently good quality products.

Company N

Company N is founded in 2002 started as a processed wood factory in Sadao, which later expanded its production from manual process to include automated machineries. Due to a large amount of byproducts collected from making processed wood, the owner introduced new products such as woodchip in 2015 and wood pallet in 2017. The company is located at located at Sadao, Songkhla. The main product is processed wood which is currently sold to the largest buyer from Mainland China, while woodchips and plastics are distributed domestically. With the new production of wood pallets this year, the company plans to expand its market to South Korea, Japan and Mainland China. Owner and managing director had an engineering background, whereby they spent over 30 years in Taiwan as a co-founder of a machinery company before moving to Thailand. This has given the company an advantage in developing optimal production facility compare to its competitors. Currently, he is in charge of the operational process. The company manufactures woodchip and plastics which export 240,000 tons per year, processed wood with 1,560,000 cubic feet per year and wood pallet capacity is 30,000 tons per year. Presently, the company has over 200 employees, with business alliances to several factories and saw mills in South of Thailand.

Company O

Company O is operating wood processing plant and distribution of various coatings. The office is located at Nakhon Si Thammarat. This is a large organization in the logging and sawmills companies industry located in Chawang, Thailand. It opened its doors in 2008 and now has $12 million in yearly revenue. There are 1 office and 3 factories which are located in Nakhon Si Thammarat. A total employee in the company is 800 employees which included all branches and regarded as the large sized company. The company's mission is to produce the quality products with efficient staffs to be one of the top leaders in this industry. Their main customer is only China 100%. However, their goal is to increase the value of rubber wood and help the farmers. The vision is to increase the production with the standard of quality as well as to increase sales and value of the product.

Company P

Company P is a private logging and sawmills company in Thepha, Thailand. The company is located at Songkhla. The employees in the company are about 14 people which is considered as small sized company. This company is a manufactory which sells sawn rubber wood and finger joint wood worldwide mainly to China. The company also makes the pallet, wooden box and machinery according to the customer's order. The wood preserving and heat treatment are serviced to the customers. The company provides two types of preserving wood which has white and green medicinal liquid. Also, the heat treatment is serviced for sawn wood. Pallet and wooden box will be produced according to the customer. The pallet has two types which are fresh and medicinal liquid-heat treatment. Therefore, the company is using two transport service providers to transport the products then forward to the train at Padang Besar.

Company Q

Company Q was founded in 1992. The company background can separate into four phrases. Firstly, phrase one is in the year 1992 to 1995, the company was just a trader to buy and sell rubber woods which order the wood piles and flooring from

wood processing plants and sawmills in Nakhon Si Thammarat. Phrase two, the wood factory was established in 1995-1997 from only 6 sawing tables and hired other companies for wood drying in order to sell the wood products to furniture factories in domestics and abroad. Phrase three, started in 1997-2015, the company increased 10 wood drying factories and sawmills. Moreover, they expanded more companies at Surat Thani. Lastly, phase 4, from 2016 onwards, the company increased 30 sawing tables and 10 wood drying factories to increase their production capacity. They use recycled wood instead of boiler to make the stream for wood drying as the company considers about zero waste which is to use materials left over from the production to maximize the benefit. The company's vision is to be a technology leader in wood sawing and drying by using computerized control system (IT) as well as they want to decrease the electricity consumption by developing a system for measuring temperature and humidity while drying. This is medium sized company with 191 employees.

Company R

Company R is founded on 9 July, 2001. The official office is located at Hatyai, Songkhla. The factory is located at Sadao, Songkhla. Their products are latex, skim crepes and chemical products which export in domestic and worldwide. Their vision is to committed to a world-class quality latex manufacturer. This company has 301 employees which considered as a large sized company. They are a manufacturer and distributor of latex and skimmed rubber which made 100% natural rubber. The company uses grade A containers and tanks to load their products then transport by trucks to ports. Indeed, the company is capable of making quick adjustments to satisfy their customer's requirements in order to effectively capitalize on current market trends. This ability has helped them to catapult to the forefront of the industry. Their core values are honesty and integrity, progressive management organization, dynamic human resources, secure working environment, product value in price and quality as well as continuous improvement, to be business excellence.

Company S

Company S is a newly established glove manufacturing company located in Krabi. The company is a subsidiary of the parent company, which has strong business background in latex concentrate and currently supplies it to rubber glove manufacturers in Malaysia and Thailand and some manufacturers in China and Europe. The group is also operating one of the largest palm oil mills in Thailand which produces crude palm oil with byproducts which are used as biomass fuel materials like mesocarp fiber, palm kernel shell and EFB fiber. The company's vision is to be a global provider of reliable and affordable hand protection solutions that meet all relevant and applicable standards for medical, industrial and food handling applications. The company's management team is comprised of savvy entrepreneurs and industry experts. They have approximately 600 employees which regarded as large sized company. Since the company is getting latex from their parent company, they are able to manage better quality of raw material at source. The company believes it has a competitive edge and a cost advantage over existing glove manufacturers, the idea of synergy in its operations and material sources. These factors may help to reduce the extreme price fluctuations and sudden price hike to allow better cost and price management for the customers.

Company T

Company T is logging and sawmills companies which located at Bang Klam, Songkhla. The company export rubber wood panels and finger joint**.** Their trading partners are including China, Japan, Korea, and France. Truck transport service providers are selected to transport the products to Penang port, Malaysia in order to export the products to vessel onwards. The company is operated for 5 years with 97 employees and is promoted by BOI. This is middle sized company. The company focuses on quality of products and delivery on time. Moreover, they are interested in eco-friendly business. Therefore, the company's vision is to become one of the 10 exporters of rubber wood processing in the South of Thailand.

Appendix C

Interview guideline for shippers or logistics and transport services users

The purpose of this interview is to clarify the insights of manufacturers and exporters who use logistics and transport services from third-party logistics services providers toward environmental sustainability and green practices in Thailand.

A copy of the research will be given to you after publishing.

Interview questions

2.1. How do you think about the environmental impacts of transportation activities?

…….

…….

2.2. What are the most important challenges, trends or the opportunities in transportation industry at a present day?

…….

……

2.3.How do you think about the transportation development in Thailand?

……

……

2.4 How do you think about green transportation and environmental sustainability?

……

……

2.5What are the strong influences for choosing transportation services providers? (Please indentify 3 of the most important influences in order of priority)

……

……

2.6. Have you heard about the Environmental Standards and Regulations? What do you think about?

……

……

2.7. Please provide some comments or suggestions you have regarding the performance in the area of transportation in Thailand?

(Comments and Suggestions from you are valuable thing for the research).

……
……

Sincerely Thanks

Please do not hesitate to contact me if you have any queries.

Name : Prapatsara Anantapokai
E-mail : fenfriend_asia@hotmail.com
Phone no. : 086-5971856

Appendix D

คำถามที่ใช้ในการสัมภาษณ์ ผู้ใช้บริการโลจิสติกส์ และ ขนส่ง ทางภาคใต้ ประเทศไทย

1. คุณคิดอย่างไรกับผลกระทบต่อสิ่งแวดล้อมที่เกิดจากกิจกรรมต่างๆที่เกี่ยวข้องกับการขนส่ง?

2. คุณคิดว่าโอกาสและความท้าทายที่สำคัญที่ส่งผลต่ออุตสาหกรรมการขนส่งในขณะนี้คืออะไร?

3. คุณมีความคิดเห็นอย่างไรต่อการพัฒนาการระบบขนส่งโดยเฉพาะระบบขนส่งในประเทศไทย?

4. คุณมีความคิดเห็นอย่างไรต่อ “การขนส่งเพื่อสิ่งแวดล้อมและการพัฒนาอย่างยั่งยืน”?

5. ปัจจัยที่ใช้ในการตัดสินใจเลือกใช้ผู้ให้บริการขนส่งสินค้าของคุณมีอะไรบ้าง?

6. คุณมีความคิดเห็นอย่างไรต่อมาตรฐานหรือกฎหมายที่เกี่ยวกับสิ่งแวดล้อม?

7. ข้อเสนอแนะเพิ่มเติมที่เกี่ยวกับระบบการขนส่งของประเทศไทยในอนาคต?

นางสาวประภัสสรา อนันตโภไคย 5710521065

Appendix E: Sample of Code Book- Themes and Definitions

Key Theme: Modes of Transportation		
Sub-theme	**Code**	**Definitions**
Road Transportation	RoT	Road is a route between two destinations, which has been either paved or worked on to enable transportation by way of motorized and non-motorized carriages
- Truck Transportation	TT	Transportation of goods and personnel from one place to another place by truck on road.
Rail Transportation	RaT	All transport over rails by moving along a track (permanent way) to transport cargo or passengers from one place to another place. Rail is less flexibility for choosing a different route or time
Sea Transportation	ST	Watercraft carrying people (passengers) or goods (cargo). Ship transport can be over any distance by boat, ship, sailboat or barge, over oceans and lakes, through canals or along rivers.
- Shipping	Sh	Referred to transport by sea. Conveyance provided by the ships belonging to one country or industry.

Key Theme: Modes of Transportation		
Sub-theme	**Code**	**Definitions**
Air Transportation	AT	All transport through the air which includes local air traffic such as small airplanes or helicopters. From a broader perspective air transport within urban or regional areas include passenger and freight air routes that cross urban or regional areas.

Key Theme: Environmental Problems		
Sub-theme	**Code**	**Definitions**
Pollutions	Po	The process of making land, water, air or other parts of the environment dirty and unsafe or unsuitable to use.
Green House Effects	GH	A natural process that warms the Earth's surface. Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons (CFCs), etc.
Low Quality of Life	LQL	The negative features standard of health, comfort, and happiness experienced by an individual or group.
Natural Resources Scarcity	NRS	The shortages of essential material such as fresh water, mineral energy sources, scarce minerals and natural plant- and animal species from land or sea.

Key Theme: Challenges and Opportunities for Transportation Industry		
Sub-theme	**Code**	**Definitions**
Information and Technology	IT	The use of any computers, storage, networking and other physical devices, infrastructure and processes to create, process, store, secure and exchange all forms of electronic data.
Economics Situation	ES	The state of the economy in a country or region. It changes over time in line with the economic and business cycles, as an economy goes through expansion and contraction.
Price Competition	PC	The rivalry between suppliers based solely on price, usually for commodious or identical items. In price competition, two products which are substantially similar are judged by prospective consumers on their respective pricing, with the purchase made mostly on the basis of which is cheaper.
Infrastructure Development	ID	The basic requirement of economic development which facilitates production in economic activities by creating external economies. Those basic facilities and services will facilitate different economic activities and thereby help in economic development of the country such as education, health, transport and communication, science and technology, etc.

Key Theme: Challenges and Opportunities for Transportation Industry		
Sub-theme	**Code**	**Definitions**
International Trade	InT	The exchange of goods or services along international borders. This type of trade allows for greater competition and more competitive pricing in the market.

Key Theme: Green Transportation		
Sub-theme	**Code**	**Definitions**
Sustainable Development	SD	The development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Fuel Efficiency	FE	That proportion of energy released by a fuel combustion process which is converted into useful work. For vehicles, it is measured in miles per gallon or kilometers per liter.
Intermodal Transportation	InT	The transportation in an Intermodal container or vehicle, using multiple modes of transportation (rail, ship,and truck) without any handling of the freight itself when changing modes. The method reduces cargo handling, and so improves security, reduces damage and loss, and allows freight to be transported faster.

Key Theme: Green Transportation		
Sub-theme	**Code**	**Definitions**
Eco-Driving	ED	The practice of driving in such a way as to minimize fuel consumption and the emission of carbon dioxide.
Route Optimization	RO	The process of determining the most cost-efficient route.
Freight Consolidation	FC	A service offered by the shipping companies to lower the total shipping cost and to amplify shipping security. Consolidation service in general includes the cargo transportation to the filling point, filling and arranging of cargo in the container, shipping documents are checked via custom process and finally lag of re-packing the shipment for delivery.
Reuse and Recycle	RR	An environmental methodology and strategy for waste minimization used to generate maximum product benefit with minimal waste.
Eco-Driving	ED	The practice of driving in such a way as to minimize fuel consumption and the emission of carbon dioxide.

Key Theme: Buying Decision		
Sub-theme	**Code**	**Definitions**
Work Capabilities	WC	A collaborative process that can be deployed and through which individual competences can be applied and exploited. It is a feature, faculty or process that can be developed and improved.
- Comprehensive Service	WC-CS	A comprehensive value adding services such as packaging and documentation, customers will come to rely on the logistics provider which will lead to an increase in customer loyalty due to dependency. Wide range of services to fulfill the competency such as inventory management, technology. Require sufficient capital, specialized skills.
- Problem-Solving Skills	WC-PS	The process of working through details of a problem to reach a solution. Problem solving may include mathematical or systematic operations and can be a gauge of an individual's critical thinking skills.
Customer Services	CS	All interactions between a customer and a product provider at the time of sale, and thereafter. Customer service adds value to a product and builds enduring relationship

Key Theme: Buying Decision		
Sub-theme	**Code**	**Definitions**
Punctuality	PU	The fact or quality of being on time.
Reputation	R	Overall quality or character as seen or judged by people in general and recognized by other people of some characteristics or ability.
Price	P	A value that will purchase a finite quantity, weight, or other measure of a good or service which determined by what a buyer is willing to pay, a seller is willing to accept, and the competition is allowing to be charged.
Credibility	Cr	The quality of being trusted and believed in.

Key Theme: Environmental Standards		
Sub-theme	**Code**	**Definitions**
Environmental Standards	ES	A set of quality conditions that are maintained for a particular environmental component and function. The different environmental activities have different concerns and therefore different standards The standards will regulate the amount of the pollutants that can be released without causing unacceptable harm to health or the environment.

Key Theme: Environmental Standards		
Sub-theme	**Code**	**Definitions**
- ISO 14001	ISO 14001	The standards related to environmental management that exists to help the company to minimize how their operations negatively affect the environment, for example, cause adverse changes to air, water, or land. The standards comply with applicable laws, regulations, and other environmentally oriented requirements. It maps out a framework that a company or organization can follow to set up an effective environmental management system.
National Environmental Policy Act	NEPA	It was one of the first laws that establish the broad national framework for protecting the environment. NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. Agencies also provide opportunities for public review and comment on those evaluations. This policy requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

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