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Risk Identification for Outbound Road Freight Transportation Service

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Thutchanan Sangwan and Jirapan Liangrokapart

Risk Identification for Outbound Road Freight Transportation Service



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The start of Asian Economic Community (AEC) at the end of 2015 will strengthen Thailand's position as a transportation hub for the Greater Mekong Sub region (GMS). It has increased Thailand's opportunities for cross-border trades and import-export shipments especially between Thailand and its four immediate neighbors - Myanmar, Malaysia, Laos, and Cambodia. The major mode of transportation among these countries is the road transportation. Fierce competition will occur as professional multinational logistics companies owned by foreigners will use their competitive advantage to get the major market shares and compete with local logistics providers. To survive the competition under the AEC, local logistics firms should identify the risks for their logistics services among the neighboring countries and find avenues to manage the risks. This paper studied relevant literatures and summarized the risks related to the Outbound Road Freight Transportation Service. The risks have been validated by industry experts, the effect of each risk on key performance indicator has been analyzed, and suggestions for mitigating the risks have been included.

Keywords: Risk Identification, Outbound Road Freight Transport, ASEAN Economic Community (AEC), Logistics Service Provider

1 Introduction

Currently, globalization is becoming an important issue of world economy. The competition in world trading is very high and increasing. Hence, many countries in each region have to improve their abilities and try to collaborate in term of international integration to enhance benefit, increase bargaining power, and gain advantage of international trading, investment, and information technology. Furthermore, the integration also comprehends in liberalization within the region to facilitate logistics activities of local company, eliminate tariff-barrier, free flow of products and services, in order to attract external investor investment and stimulate demand.

ASEAN Economic Community (AEC) is the one of the international integration among between 10 ASEAN member countries for overall benefit and competitive advantage of members especially in international trade. AEC is going in the same direction as European Union (EU) has done.

The initiative of AEC integration was from the 9th annual meeting of ASEAN members in Indonesia in 2003. The idea of community comprises three elements include ASEAN Political-Security Community (ASPC), ASEAN Socio-Cultural Community (ASCC), and ASEAN Economic Community (AEC) under the slogan "One Vision, One Identity and One Community". Being signed in 2007, "AEC Blueprint" was designed to have the clear plan and framework, so that it will be fully implemented by the end of year 2015. The AEC Blueprint consists of four important characteristics including single market and production base, highly competitive economic region, region of equitable economic development, and region fully integrated into the global economic.

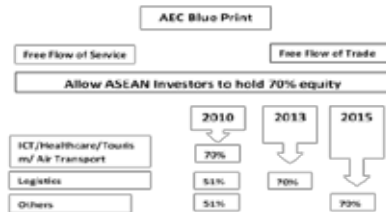


Figure 1 Timeline of Liberalization plan, adapted from AEC Blue Print (2008)

Figure 1 represents the timeline of liberalization plan in each sector before the official opening of AEC at the end of year 2015. Logistics are considered as the important sector which is also included in the Blueprint. The logistics free flow in ASEAN started in 2010.

1.1 Impact of AEC on Road Freight Transportation Service

The opening of AEC will have direct impact on most of industries in Thailand. The advantages of Thailand including central location, facilities, infrastructure, capability, and low production cost will strengthen Thailand to be the transportation hub for the Greater Mekong Sub-region. Hence, the opportunity for cross-border trade and export-import shipment will be increased, and it will benefit the four immediate neighbor countries namely Myanmar, Cambodia, Laos, and Malaysia. Due to the major mode of transportation in these GMS countries is road transportation, the opening of AEC will increase the demand in exports and import products and border trade. Hence, the demand for Road-freight transportation service will also in-

crease. In order to support such demands, ASEAN Highway under Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT) and ASEAN Agreement for the Facilitation of Inter-State-Transport (AFAFIST) have been issued for the members to prepare their transportation routes and infrastructure to facilitate goods in transit. According to the Master Plan on ASEAN Connectivity, six new routes have been constructed in Thailand to support the goods in transit associated to eight custom houses. The total distance of these routes is about 4,477 kilometers.

The increase of market demand, free flow of goods, services, trade, labor, capital, and investment is not only benefit Thailand and the Thai corporations but also create great opportunities for the multinational companies or investors to take the benefit of bigger market with less regulation. In logistics sector, foreigner logistics companies will enter the competition professionally and use their competitive advantage to gain more market share from local logistics providers. Hence, Thai logistics providers need to improve their service and efficiency in order to compete with the multinational companies, maintain the market share, and increase opportunity to attract new customers.

Hence, Thai companies need to reduce the risk which may occur and disrupt the company performance and have negative impact on the local companies. The focus of this study is limited to the outbound road freight transportation service in the land-link ASEAN countries namely Thailand, Laos, Cambodia, and Myanmar only. To mitigate the risks, there is a need of identifying the risk factors since they will negatively affect the company's performance.

Therefore, the objectives of this study are:

1. To identify risk factors for local logistics service providers (LSP) in respect of the opening of AEC.
2. To suggest the way to mitigate the risks and gain competitive advantages.

2 Literature Review

2.1 Definition of Logistics Service Provider

Lieb.et.al (1993) defined logistics and transportation service provider as an external company which offers service related to logistics activities for customers. Sorat (2008) stated that logistics service provider is an external organization which experts in logistics activities under contract in exchange with benefit. Transportation is one of the important logistics activities. Pathomsiri (2010) defined transportation as the process of moving people, goods, and service from one location to another location in order to meet the customer requirement and link logistics activities together. Therefore, transportation is an important factor contributing to sustain the economic growth and increase the competitiveness for the country. Komnamul (2007) also agreed that current action puts logistics more emphasis on transportation due to every logistics activities needs to link with each other by transportation. The logistics activities include transportation of raw materials that serve manufacturers for production and transportation of finished goods to distribute to customers. Road freight transportation service is a major part of LSP services which is the focus of this study.

2.2 Risk Management for LSPs

Jenkins et al., (2010) and Rao and Goldsby (2009) presented general risk management process as shown in Figure 2. The process starts from establishing the context including internal and external factors, objectives, and risks. Then the risk assessment should be performed via 4 steps: risk identification, risk analysis and risk evaluation, followed by the risk treatment. The process should be monitored, reviewed, communicated, and consulted continuously. It is expected that the implementation of risk treatment which is treated, shared, retained, and avoided will result in a better performance.

According to report from ABNAMRO in January 2015 on LSP industry, more than 90 percent of the LSPs and transport companies claim to be aware of their principal operational and strategic risks. However, only 61 percent of those have an alternative plan if there is a major breakdown in their operations. Just fewer than 50% of the companies express the business implications in monetary terms. This means that the Transportation and Logistics sector is on the right track; now they need to move to the next step and adopt a more mature risk management approach. Companies should systematically map out risks that might affect their business objectives and formalize their measurement control.



Figure 2 General Risk Management Process adapted from Jenkins et al., (2010) and Rao and Goldsby (2009)

Risk is defined as uncertainty of situation or event which can negatively affect the performance of organization, or event that has a few probability to happen but can harm the organization both in short term and long term sustainability, Tang and Musa (2010). Goh et al. (2007) stated that source of risk can be categorized into 2 groups namely internal instability in organization and external environment. In addition, Brenchley (2000) categorized loss into 6 groups: financial loss, performance loss, physical loss, psychological loss, social loss, and time loss. Jenkins et al. (2010) defined risk and harm as a probability of occurring the damage which is the consequence of loss in operations. Moreover, they divided risk management processes to 3 steps: risk assessment, risk control, and risk review.

From extended literature in respect of risk management in logistics service providers, a number of risk models have been found. Pujawan and Geraldin (2009) presented the "House of Risk" model to investigate risk based on

case study of a fertilizer company in Indonesia. Berle et al. (2013) presented the risk assessment and flexibility of transportation sector for liquid natural gas (LNG) cargo. Caputo et al. (2011) proposed the impact of accident risk in road transportation in a hydrogen cargo. Yang (2011) presented risk management of Taiwan maritime supply chain security which is under the rule of container security initiative (CSI) according to 24-hour rule and use bowtie diagram to investigate risk management strategy. Tummala and Schoenherr (2011) presented the assessing and managing risk using the Supply Chain Risk Management Process (SCRMP). Harland et al. (2002) presented risks in supply chain network by defining loss, consequence, and probability of occurrence in each logistics activity. Liangrokapart (2012) studied Supply Chain Impact Analysis using a case study of hospital supply chain disruptions in Thailand.

In addition, Benchaley (2000) showed the risk in cargo transportation by illustrating risk event, consequence, business impairment, and magnitude of loss respectively. Chopra and Sodhi (2004) investigated risk management in supply chain in order to avoid or mitigate supply chain system breakdown by defining categories of risk, illustrating risk driven and suggesting risk strategy. Gaudenzi and Borghesi (2006) presented the use of AHP model to evaluate the supply chain risk focusing on customer requirement, on time delivery, order complete, order correctness, and damage free detection. Schroeder and Gomes (2014) investigated risk of international trade operations in order to support the entrepreneur in managing their risk. Peck et al. (2003), mentioned risk management of LSP whether the logistics operators still run and are aware of risks based on day by day

assessment. However, there are just a few formal researches which consider risk management and figure out quantitative the probability of occurrence, severity as well as mitigation strategy to support decision making of logistics companies.

2.3 The Impact of the Risks

Performance measurement becomes an interesting issue over past 20 years. The well-known adage of performance measurement "if you can't measure it, you can't manage it" stated by Hamel and Prahalad (1994). The definition of performance measurement can be explained by understanding the action in each activity in order to lead organization to reach target objectives. Chan and Chan (2004) explained the definition of performance measurement in term of how to meet the goal by focusing on output efficiency.

To know the level of the risk impact on supply chain, appropriate key performance indicators (KPIs) should be developed. This study has reviewed supply chain and LSP performance measurement literatures focusing on the KPIs influencing customers to outsource their logistic activities. Pederesen and Gray (1998) defined key factors of transportation selection criteria as time, cost, and service quality correspond with experts' opinion. These represent the reliability of firms as in Figure 3.

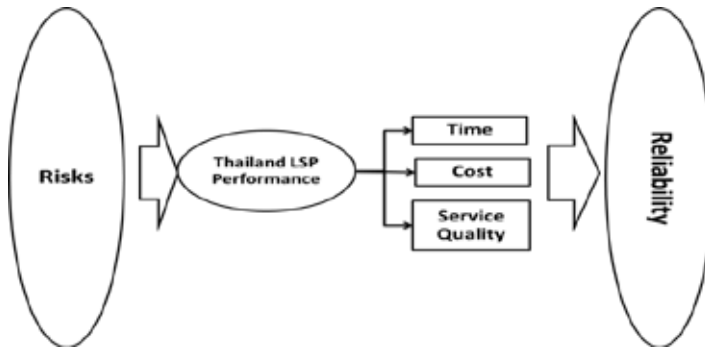


Figure 3 Risk impact on LSP performance indicator, adapted from Peder-
sen and Gray (1998)

3 Research Method

The research methodology used in this study starts from 1) identifying the problems in the logistic service industry, 2) summarizing risks in the industry and its impact on KPIs from previous literatures, then 3) asking experts to select the risks and define the risks levels based on the severity and the probability of occurrence, and finally 4) Proposing the avenues for mitigating the risks as shown in Figure 4. To identify the risk, the interview was conducted with three experts who have experienced in LSP industry as shown in Table 1. Experts have been interviewed in get the current problems and overview of working process. The risk factors were identified by extracting from relevant literature and coding from the expert interview when they answered the questions: what can go wrong in each process, what are the opportunities to occur and how much does it negatively affect the companies based on the KPIs.

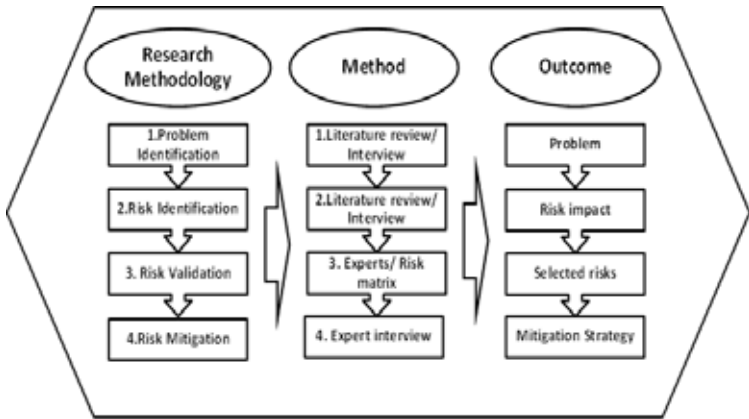


Figure 4 Research method

The research framework contains the risks occurring during the flow of goods and services from manufacturers through distributors, passing the outbound customs border, free zone goods in transit, inbound customs border, and at the end, to the customers.

Table 1 Overview of company representative interview

Company type	Interviewees	Nationality
LSP	Marketing and Sale Manager	Multinational
LSP	CEO	Thai
LSP	Managing Director	Multinational

The risks affecting the financial and information flow are also brought into consideration. From the research framework, there are 3 major research questions involved. They are:

1. What are the current problems or risks of road freight transportation and LSP associated with current working process and KPIs of firms?
2. What are the level of risks based on the probabilities to occur which lead to negative consequence to road freight transport and LSP and the severity of the impact to KPIs of companies?
3. How to manage each risk, if occurs?

4 Findings

4.1 Identifying the Problems in the Logistic Service Industry

The findings for this step are the answers to research question 1. Although the goal of AEC is going in the same line with the EU, but there are still many differences between AEC and EU. From SCB Research Analysis EIC (2012), the EU took 35 years to become real free trade area by completely implementation of single market, free transportation, and no customs procedures. The current practice of the AEC cross border transportation still does not relax the laws on the cross border customs procedures. Trucks have to stop at border checkpoint in order to pass customs process. Moreover, the trucks have to transit goods in the free zone due to constraints of vehicle standard of each country and also the limited of quota permit of cross border trucks.

In addition, there are approximately 18,399 LSPs in Thailand and the growth rate is about 3.7 percent per year. Visondilok et al. (2012) stated that the LSPs provide transportation services to the customers mainly by truck transportation which is account for 82 percent of total freight transportation. This study focuses on the truck transportation and the problems occurred by the opening of AEC which affect the local LSPs' performance. The associated risks are identified in the next section.

4.1.1 Summarizing Risks in the Industry and its Impact on KPIs from Previous Literatures

In this step, the risk factors were identified from previous literatures and experts interview. After reviewing the literature, risk factors were identified in large amount and were selected only the necessary factors which relate to outbound road freight transportation base on experts' opinion. For example Kersten et al (2012) mentioned about the staff performance and responsibility, vehicle breakdown, technical defects of vehicle, and delay customs process in border area. Whereas Chopra and Sodhi (2004) mentioned about the risk factors namely seasonal factors, supplier bankrupt, and customs system failure. Pujawan and Geraldin (2009) referred to exchange rate fluctuation, and delay on time delivery both by supplier and non-supplier. Rogers et al. (2013) stated that the important problems supply chain is from low commitment with partner and lack of appropriate IT system. After risk factors were selected from previous literature, experts suggested to add more risk factors in general processes such as staff breach a safety rule, inadequate truck, strategy in term of truck investment plan and delay in doc-

ument process. Moreover, experts also emphasis on the changing of government regulation from the opening of AEC which will attract foreign investors to gain the benefits and market share. Hence, the declination of customers and competitors increasing therefore becomes the critical point to concern. According to selected risks above, risk factors can be categorized into 7 groups: disruption, operations, financial, strategy, regulation, system, and marketing. And the definition of each category is in Table 2.

Table 2 Risk Categories

Categories	Description
Disruption	The event that is unable to plan may have seriously disrupt to operation of road freight transportation line
Operation	The error of truck, staff, and operation process which may make a loss to firms
Financial	The event that may make company loss in term of financial
Strategy	Risk from business implementation base on business strategy
Regulation	Risk related to the trade regulation
System	Risk from system failure
Marketing	Risk relate to the decrease of market value

4.1.2 Asking Experts to Select the Risks and Define the Level of Risks Based on the Severity and the Probability of Occurrence

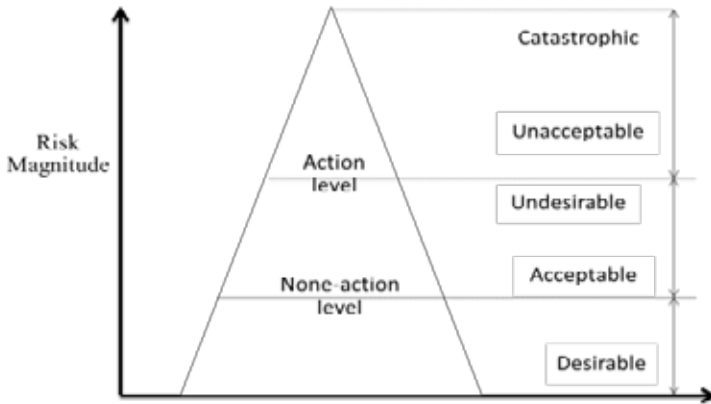


Figure 5 Risk Level, Adapted from Rao and Goldsby (2009)

In this step, the levels of risks were determined based on expert opinions. The experts were asked to define level of risk magnitude based on levels of each risk. The levels of each risk were categorized into 5 levels namely desirable, acceptable, undesirable, unacceptable, and Catastrophic as shown in Figure 5. Then, the outcome of this step answers research question 2 as shown in Table 3.

Table 3 The levels of risk base on experts opinion

Code	Risk Factors	Category	Risk Level
F1	Natural disaster	Disruption	Acceptable
F2	Staff breach a safety rule	Disruption	Undesirable
F3	Seasonality factor	Disruption	Undesirable
F4	Damage product from accident	Operation	Undesirable
F5	Staff performance and responsibility	Operation	Catastrophic
F6	Vehicle condition	Operation	Undesirable
F7	Blurring boundaries between buying and supplying companies in the chain	Operation	Undesirable
F8	Inadequate truck	Operation	Undesirable
F9	Delay customs process in border area	Operation	Catastrophic
F10	Delay on time delivery	Operation	Catastrophic
F11	Delay document process	Operation	Catastrophic

F12	Supplier bankrupt	Financial	Acceptable
F13	Exchange rate fluctuation	Financial	Acceptable
F14	Truck investment plan	Strategy	Undesirable
F15	Low commitment of partners	Strategy	Undesirable
F16	Government regulation	Regulation	Unacceptable
F17	Lack of appropriate IT	System	Acceptable
F18	Breakdown custom system	System	Undesirable
F19	Increasing competitor	Marketing	Undesirable
F20	Customer decline	Marketing	Catastrophic

From above Table, there are 6 factors locating in catastrophic namely staff performance and responsibility, delay on time delivery and customs process and document, and customers decline level (due to these factors are high severity and almost certain to happen and should have immediate action to reduce these risks). One more significant risk is government regulation that will change after AEC is started. The company should manage this risk and be ready to encounter. The other risks that not locate in critical area do not require for immediate action but company should monitor the situation and prepare for emergency plan.

4.1.3 The Avenues for Mitigating the Risks are Proposed

Base on the theory of 4Ts of hazard response, Enyinda (2008), risk mitigation process requires the judgment from the experts. The 4Ts are the strategy to manage the significant risk by the common means to mitigate the risk. 4Ts stand for:

1. Treat: It is the actions which can be performance to control or reduce the probability and severity of risks, so that supply chain disruption can be prevented.
2. Take: It refers to the risk acceptance or the risk that cannot be treated or managed.
3. Transfer: It refers to the sharing of responsibility to another party if the risks occur. The risks can be shared by using insurance, or out-sourcing the operations of the organization to other parties such as supplier, sub-contractors.
4. Terminate: The risks can be eliminated by doing things differently, so that opportunities leading to the risk caused by particular activities can be avoided.

In this study, experts suggest means to mitigate each risk factor as shown in Table 4.

Table 4 Risk mitigation base on 4Ts strategy

Code	4Ts Strategies	Description
F1	Take	Follow the situation and prepare for emergency plan
F2	Treat	Strengthen safety policy and monitor staff behavior to follow the safety rule
F3	Treat	Apply information technology to enhance the accuracy of forecast
F4	Terminate	Train the staff to be aware and avoid behavior leading to probability to get damage
F5	Treat	Strengthen safety policy and responsibility and do not assign too much job to staff
F6	Terminate	Avoid the action that leads to vehicle breakdown, evaluate vehicle before start working, and train staff to be able to solve problem immediately
F7	Treat	Set a responsible clarity and task

Code	4Ts Strategies	Description
F8	Treat	Apply the tool to enhance the accuracy of demand forecasting and outsourcing supplier
F9	Terminate	Prepare accurate and completed customs document to reduce waste time
F10	Terminate	In case of supplier, check suppliers network before assigning the shipment appropriate shipment to suppliers. In case of non-supplier, check the route & condition before accept the shipment, avoid bad traffic and poor route, and check the accuracy of map to prevent driver from getting lost
F11	Treat	Define the appropriate lead time in each process, then assess and monitor
F12	Transfer	Use various suppliers to share responsibility and audit and monitor supplier performance

Code	4Ts Strategies	Description
F13	Transfer	Sign contract to fix exchange rate value and crop insurance for exchange rate fluctuation
F14	Transfer	Outsource the suppliers and compare each of them to offer the selection of the best alternative
F15	Treat	Set a responsible clarity and task
F16	Treat	Always be informed of government situation
F17	Take	Implement software at least appropriate with customers and customs system
F18	Take	Monitor the situation due to being unable to control
F19	Treat	Enhance customer relationship management to maintain customers base
F20	Treat	Enhance customer relationship management and improve service quality

After mitigation strategies were suggested, experts were asked to classify impact of each risk based on KPI which influences the customer to outsource LSP based on decision criteria of Pedersen and Gray (1998) namely time, cost, and quality. The levels of impact were classified into 3 levels by H = high level of impact, M = medium level of impact, L = low level of impact as shown in Table 5.

Table 5 Assessing impact of risks associate with each KPI

Code	Risk Factors	Time	Cost	Quality
F1	Natural disaster	N/A	N/A	N/A
F2	Staff breach a safety rule	M	M	M
F3	Seasonality factor	M	M	M
F4	Damage product from accident	H	H	H
F5	Staff performance and responsibility	M	M	H
F6	Vehicle condition	H	M	H
F7	Blurring boundaries between buying and supplying companies in the chain	M	L	L
F8	Inadequate truck	M	M	H

Code	Risk Factors	Time	Cost	Quality
F9	Delay customs process in border area	H	L	H
F10	Delay on time delivery	H	L	H
F11	Delay in document process	H	L	H
F12	Supplier bankrupt	L	L	H
F13	Exchange rate fluctuation	L	L	L
F14	Truck investment plan	L	H	M
F15	Low commitment of partners	M	L	H
F16	Government regulation	M	L	L
F17	Lack of appropriate IT	M	L	M
F18	Breakdown custom system	M	L	M
F19	Increasing competitor	M	M	M
F20	Customer decline	H	M	M

From above table, N/A means the effect of F1 does not include in performance measurement for customer consideration due to being unable to

control. While F4 refers to the critical factor since it has highly effect on all criteria. If it is concerned separately, cost reduction should focus on the factors which have high level of impact on cost namely F4 and F 14. In term of service quality, F4, F5, F6, F8, F9, F10, F11, F12, and F15 should be mitigated if service quality is required to improve. For F4, F6, F9, F10, F11, and F20 impact on high level of time disruption. In daily working process of LSP, there are many risks affecting different levels of company performance which is the important criteria for customer consideration. Hence, to improve performance of firms, risk management is one of effective way for LSPs consideration.

5 Conclusion and further research

This research has revealed the risks for local LSPs in Thailand when the stronger Multinational LSPs have entered the ASEAN market and compete with the LSPs. The levels of risks have been determined in order to help local LSPs to survive and the strategy to manage the risks have been proposed. However, this study is just a preliminary research and the findings are limited only to the literature review and expert opinions. The scope of this study covers the risks related to the Outbound Road Freight Transportation Service. Extensively quantitative surveys in the future are recommended in order to gain more precise quality of the risks, the impacts, and the ways to effectively mitigate the risks. The expansion of the scope is also suggested as well as the detail of relationship between each risk in the study.

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