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An Investigation and Evaluation of Cross-Border Truck Transportation from Mae Sot-Myawaddy to Yangon

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Abstract— This study investigates both direct and indirect factors that affected to cross-border truck transportation from Mae Sot-Myawady to Yangon. The study used 200 respondents for collecting data, employed the SEM model and used Confirmatory Factor Analysis (CFA) to figure out factors loading. From the result, it found that the reliability of transportation service provider was the most important factor, which effected to cross-border truck transportation; the factor loading was equal to 0.92. Even though, traders and transport participants who used Mae Sot-Myawaddy to Yangon route concerned other related factors due to instability and minority conflicts in Myanmar, this study could be a potential advantageous guideline for forming competitive advantages and strategy development of using cross-border truck transportation.

Keywords— *Cross-border, Truck, Transportation, factor, Ease-West Economic Corridor, Thailand, Myanmar*

1.   Introduction

Cross-border development has become a trigger of substantial economic growth. Myanmar was considered as a burgeoning country, which has an attractive demand and abundant of natural recourses. The volume of cross-border trade between Thailand and Myanmar was increased sharply every year since 2009 [17]. As the result from trade statistic show that cross-border trade was acquired more than 80% of total trade (241,387 baht million in year 2014) and most of products that Thailand exported to Myanmar were diesel and benzene fuels, alcohol beverages, non-alcohol beverages, cloths and threads, palm oils,

instant foods, steels, cosmetic products, and construction products while the products that Myanmar exported to Thailand were natural gases, live animals, woods, wooden products, minerals, metals, and fertilizers [3]. Moreover, cross-border development between Thailand and Myanmar has played an important role in the Mainland Southeast Asia. Therefore, cross-border truck transportation operated between Thailand and Myanmar became more crucial and necessary for trading products. Similarly, an economic booms and labour shortage crisis in Thailand was created the pull conditions that made a rapid growth of border activities in terms of flowing goods and people, which led to a development of transportation infrastructure and transportation facilities. Also, Mae Sot-Myawaddy cross-border transportation was practically became a principle element of doing business with Myanmar.

In additional, the route from Mae Sot-Myawaddy to Yangon was a part of East-West Economic Corridor, which considered as the most advantageous economic corridor [12]. It was only 441 kms from Myawaddy to Yangon and only 15 hours by heavy truck. The Border cities, Mae Sot and Myawaddy were considered as potential border towns of Thailand and Myanmar in many decades. Both of border cities shared similarity of cultures, foods, and living styles. Likewise, most of Thai people who lived in border area were able to speak Myanmar language while Myanmar people could speak Thai.

Mae Sot was the biggest border city known as the most economic border city, located in the western part of Thailand, shared the border with Myanmar, and separated land by Moei River. In the

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historically, the first settlers of the town were the Karen (The major tensions ethnic group in Myanmar), from those reasons, it made the town more distinct from other border towns in Thailand [8]. Even, Myawaddy was a smallest city of Myanmar but the city was recognised as an important trading and economic city of Myanmar. Myawaddy was located in the south-eastern part of Myanmar and most of Myawaddy people were Karen. In trading term, the city was considered as "Sister Cities" with Mae Sot. That was the reason why Myanmar government had settled and established Myawaddy Border Trade Zone, which was around 1,164 acres and imitated the city from form Muse 105th Mile Border Trade Zone in Muse-Ruili borders-located between Myanmar and The Republic of China.

From Mae Sot-Myawaddy to Yangon, the route was a part of Asian Highway 1 Road (AH1). There were many foreign countries that noticed and intensively invested in facilitating support i.g. Japan and Chinese. Moreover, the way from Myawaddy to Yangon connected to the route from Kyondoe to Mawlanyine where Dawei deep seaport project was located. Hence, all of the roads construction projects were intensively constructed, in order to support the Asian Community. Therefore, the road infrastructure projects were stimulated cross-border truck transportation flows and generated an increasing of trade volume.

However, the level of transportation's complexity was shaped cross-border activities , which depended on the impact of management i.g. difference of driving rules, the weight loading capacity of the bridges, The limit bearing capacity of the bridge was only 25 tons while most of Thai trucks weight were over, lacking in quality of road infrastructure and the size of the lane, which wide only 2.5 meters, traffic in some part of township areas that could lead to the lowering the speed of transportation, non-transparent of the toll fee collecting, which have more than 15 collecting fee points and controlled by Karen, the a minority group.

The objectives of this study were to investigate cross-border truck transportation factors and apply the research finding to develop the strategies in order to sustain cross-border truck transportation on Mae Sot-Myawaddy to Yangon route.

2.   Literature Reviews

Based on reviewing of the literatures, there were many researchers that studied on the advantages of transportation, the affecting of transportation, and transportation factors. Most of trade and transportation facilitation were focused on reducing, eliminating, hindering barriers and circulating transportation flows which helped to stimulate transportation activities [5]. Managing transportation mainly focused on manufacturers, distributors, and third-party logistics providers for improving efficiency of the whole supply chain [2]. Moreover, transportation can be define as a group of elements, which includes the interaction of both demand trading in the area and the preparation of the transportation service provider, which were able to fulfil the demand requirement [2]. In additional, transportation was not only a cost expenses because it also generated time and place utilities as considered as important elements in trade satisfaction [4].

At the same time, the selection of the transportation was commonly based on cost and time; the factors generally depend on the type of industries, purposes, and often look in alternative ways for shipping products even in the similar location and destination [11]. Efficiency of the transportation system was developed from the nations. It could be affected to the economy. Lacking of transportation development limits the extension of the market [1]. A high quality of transportation system was a major component that generated a potential economy and society. It also generates competitiveness of production location [16].

The factors that affected to transportation were influenced by 3 factors; cost, time, and reliability [7]. And transport operation factors can be separated into external and internal factors. The external factors includes basic infrastructure, trade barriers, export control, licenses, law and taxation, service, economic condition, communication system, climate, and culture [15].

In the other hand, transportation was also based on a range of other factors, which includes physical geography, distribution, transportation networks, the structure of economy and governments' policies, investment and taxation [13]. Generally, when traders made decision for transportation, it based on the perception of service availability [10]

and the service level was more important than cost of transportation[9].

From the literature reviews, the researchers developed a conceptual framework of cross-border truck transportation system as it showed in Figure 1. It can be clarified interaction between transportation system and activity system. The transportation system consisted of demand and supply as the major components. In the conceptual model, the demand was driven by trade demand; depending on the purposes and destination agreements.
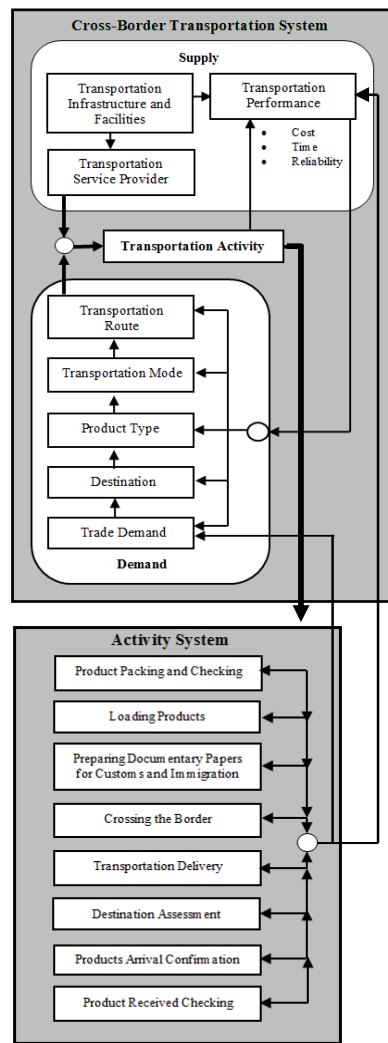

Figure 1. The conceptual framework of cross-border truck transportation

Availability of transportation modes determined and decided by the type of products, which can identify transportation route. For the supply, it was

composed by transportation infrastructure and facilities. If there was no transportation infrastructure and facilities, the transportation service provider would not be able to operate their activities because those components were considered as major supplies of service provider. Also, transportation performance was an indicator of the service performance of supplier or transportation service provider, which includes cost, time, and reliability.

When the demand met the supply, the transportation activity would be leading to another process namely Activity system, included all processes of transportation activities from begin till the final process. It was started from packing and checking products before sending it to transportation service provider, loading product into the truck, preparing documentary papers for custom clearance and immigration processes, crossing the border by using the Friendship bridge, deliver product to the destination, then a receiver would receive the products, checked products that received again and confirm to the sender.

However, it was difficult and complex due to the different of road and bridge infrastructures between Thailand and Myanmar. Most of products from Thailand have to be reloaded into other trucks at less 2 times before arrive the destination in Yangon. Therefore, the transportation flow of cross-border between Thailand and Myanmar was considered as complicated.

The researchers could summarize the flow of truck transportation from Thailand to Yangon as shown in the Figure 2.
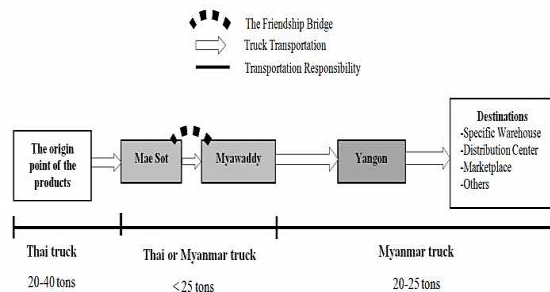

Figure 2. Mae Sot-Myawaddy to Yangon cross-border truck transportation flow

The overall cross-border truck transportation from Mae Sot-Myawaddy to Yangon was started from

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the origin point of the products, generally came from the central part of Thailand due to the core and abundant of the manufactures. From Mae Sot, the responsibility of carrying products was belonged to Thai transportation service provider; Most of Thai truck weight loading capacity was around 20-40 tons. Therefore, before crossing the bridge, the products have to be reloaded into a smaller truck either Thai or Myanmar trucks, which have the maximum weight loading capacity only 25 tons due to the weight bearing capacity of the Friendship bridge. However, if the truck carried products crossed the bridge to Myanmar; the products have to be reloaded into Myanmar truck, because only Myanmar trucks were able to drive into Myanmar boundary.

3.   Research Methodology

This research was designed as an Explanatory sequential mixed method. Firstly, it was conducted quantitative research and explained the result in deeper detail by using qualitative research. The Quantitative data was gathered from cross-border truck transportation participants both of Thai and Myanmar by using a Likert scale questionnaires to collect the data (1=very low, 2=low, 3=average, 4= high, 5=very high) while the qualitative data was gathered from the narrative combine views of 5 participants who had deeply experiences with cross-border truck transportation industry more than 5 years.

In terms of data collection, the sampling was used non-probability and based on the rule of thumb calculation, thirteen variables were identified and constructed the model. Collecting the data was designed into the purposive and snowball methods and can be divided into 5 sample groups, which includes traders, transportation providers, custom brokerages, custom officers, and immigration officers. Also, the questionnaires were pre-tested with 30 of respondents, in order to confirm the content validity, revised the structure where necessary and finally collected the data from 200 respondents with an employ of the SEM model.

For the research tools, the similar questionnaires designed were used with all sample groups, because the answers required similar basic perception of cross-border transportation. The interview was unstructured questions in order to give a chance for interviewees to give their opinions and discussed freely. Moreover, a primary data from observation was conducted by survey in transportation areas; it took 5 days 3 rounds (15 days) for collecting data. The data from questionnaires were used Confirmatory Factor Analysis (CFA) by using Analysis of Moment Structures (AMOS) version 22 as a data analysis program for SEM while the data from interviews were help to the result merely understand.

4.   Cross-Border Truck Transportation Factor Model

According to the literature reviews, researchers employed the model for cross-border truck transportation factor from Mae Sot-Myawaddy to Yangon based on the theoretical reviews, the model was constructed from the related direct factors which affected to the transportation. Cross-border truck transportation mostly was driven from trade demand, forming by three latent variances includes cost, time, reliability and thirteen unique variances.

The concept of cross-border truck transportation factors from Mae Sot-Myawaddy to Yangon can be best summarized in Figure 3.
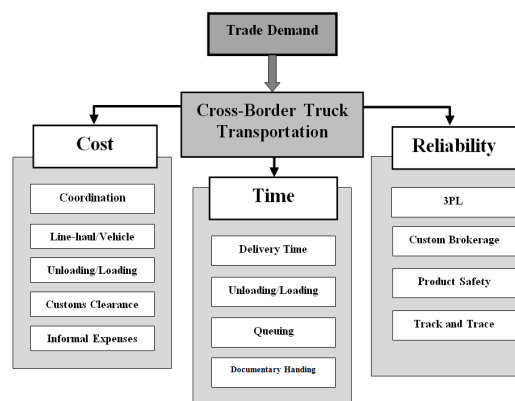

Figure 3. Cross-border truck transportation factors Model

Cost variance composed by five unique variances, which were 1)coordinator and contacting cost that paid for cooperation and communication between traders, 2)line-haul (vehicle) cost that charged from service provider including fuel cost, labor cost for unloading and loading products, 3)cost of customs clearance process ,and 4)other related informal expenses i.e. non-transparent fee and tea-money. *Time variance* composed by four relate unique ,which were 1) delivery product process from the starting point to the destination, 2)

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unloading and loading process, 3) queuing process at the Friendship bridge ,and 4) documentary handing process. *Reliability variance* was consisted of 1) the reliability of transportation service providers known as Third-party logistics service providers, 2) custom brokerage who responded for managing cross-border shipment process, 3) product safety when using Mae Sot-Myawaddy to Yangon route, and 4) ability of track and trace for checking product status.

5. Cross-Border Truck Transportation Modeling

The SEM model was integrated from direct factors of transportation, which based on the theory [7], following the step guidelines of running the model. The manifest indicators were subjected CFA and also measured the model fit. There were three main factors, then employed the model included Cost, time, and reliability as shown in Figure 4. Each contributed factors consisted of many sub variances, however, the related variances would have different levels of affecting truck transportation. Therefore, researchers developed the model in order to derive the weight of factors, prioritize factors and develop suitable strategies to improve cross-border truck transportation performance for increasing the transportation demand of using Mae Sot-Myawaddy to Yangon route in the future.
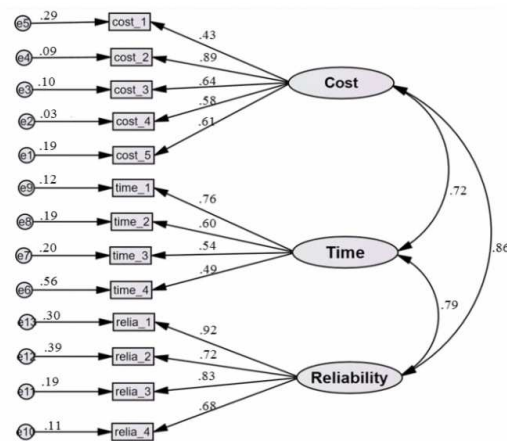

Figure 4. AMOS graphics output of cross-border truck transportation factors

Model Fit Index: Chi-square=37.561 Degrees of freedom=42, Probability level<0.001, CMIN/DF=1.093, NPC=5.740, FMIN=3.40, RMSEA=0.20, NFI=0.49, CFI=0.896(NFI and CFI close to 1=very good fit).

6. Discussion

A number of strong and significant relationships were found in this research. From the research finding, it was clearly shown that the reliability of transportation service provider was the most highly affected to cross-border truck transportation from Mae Sot-Myawaddy to Yangon, ,which has the highest factor loading equal 0.92 , following by cost of line-haul that spend for transportation service (0.89), reliability of product safety during transportation (0.83), lead time use for delivery products (0.76), reliability of custom brokerage (0.72), ability to track and trace (0.68), labor cost for unloading and loading products (0.64), cost of other related informal expenses (0.61), time that use for unloading and loading products (0.60), cost of custom clearance (0.58), time usage for waiting queue at the border station (0.54), time that use for handling documentary paper before crossing the border (0.49), and cost that spent for contacting and coordinating the transportation (0.43) as shown in Figure 4.

7. Conclusion

In summary, this study showed the results from the investigation of cross-border transportation factors by empirical study the perception of 200 respondents includes traders, transportation service providers, custom brokerages, custom officers, and immigration officers, both Thai and Myanmar nationalities equally. The data from questionnaires were tested and employed the model by structural equation modeling (SEM) through AMOS, and explain the results merely clear by the deep interview from five experts in cross-border truck transportation areas. The main objectives of finding the factor loading were divided into two perspective outcomes, which were contributed for academic term and managerial term. For academic term, the research could interpret the component of cross-border truck transportation factors, factor prioritization, and factor loading. For managerial term, the reader could be able to apply the results to develop the strategy for transportation management, operation management, and also risk management, which could be occurred from many variances of cross-border truck transportation. Additionally, transportation service provider was played a major role affected to cross-border truck transportation than cost. Therefore, increasing cross-border trade demand and stimulate the

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economic growth of the nations. Both Thai and Myanmar participants should focus on encouraging and supporting transportation service providers to improve the efficiency of performance, maintain the standard, and build trust to their services. However, not only one factor that transportation participants should concern but also other factors, which could affected to cross-border truck transportation such as road infrastructure developing, bridge infrastructure, simplifying the cross-border trade and transportation processes, and non-transparent cost of transportation and trading.

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