FRAMEWORK FOR BUILDING A COMPETITIVE ADVANTAGE FROM CHINA-LAOS RAILWAY FOR THAILAND EXPORTS TO CHINA

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ABSTRACT

This paper aims to analyze the effect of the China-Laos railway on the export trade from Thailand and China. Based on the analysis and findings, the authors propose a framework for building a competitive advantage for Thai industries exporting to China. First, the authors conducted a study of Thailand's exports to China and the current transportation routes. Then, this paper will introduce new routes that will be formed after the completion of the China-Laos railway. Next, the authors will determine the weight of determining factors through AHP analysis. Then, applying the TOPSIS method to compare the performance of the new and the existing routes based on the determining factors. Finally, the author found that the routes can provide better transportation performance. Based on the results of this study, a framework is presented for governments and companies to take advantage of a new route to improve their trade performance and competitiveness.

Keywords: Framework, Trade Performance, The China-Laos Railway, Thai Industries

INTRODUCTION

With the establishment of the ASEAN Free Trade Area and the signing of the Regional Comprehensive Economic Partnership (RCEP) agreement, China began to pay more and more attention to trade cooperation with Southeast Asian countries (Bin & Mengrong, 2018). China and Thailand are important trade partners. In 2019, the bilateral trade reached US $80 billion, of which China's exports reached 50.98 billion USD, up by 1.6% annually, while imports reached 29.02 billion USD, which is down by 3.4% annually. Thailand's trade deficit is growing with China, and increasing exports have also become a priority for Thailand's economic development. Railway transportation has the advantages of large transportation capacity, low transportation cost, and fast transportation. Therefore, it has been used as an important mode of transportation in international trades. However, the transportation modes of trade between China and Thailand are mainly sea, and land transportation, with sea transportation, is as high as 85% (Valinluck, 2019). The establishment of the China-Laos railway will provide a new transportation route from Thailand’s exports to China. As a neighbor of China and Thailand, Laos bilateral trades are small, and the China-Laos railway plan will be used to transport goods 14 times a day and 4 times for passengers. The China-Laos railway plan will be used to transport goods 14 times a day and 4 times for passengers. The railway gives China and Thai industries more opportunities (Yangyang & Li, 2020). However, the studies on the opportunities the railway will bring to Thai businesses are still limited. Some companies do not understand the railway advantages to improving trade performance and trade competitiveness. This paper aims to analyze the effect of

the China-Laos railway on the export trade from Thailand and China. Based on the analysis and findings, a framework for building a competitive advantage for Thai industries exporting to China will be proposed. Firstly, the authors study through a literature review and identify the major trade lanes, areas, and industries of Thailand exports to China and then use secondary data analysis method to identify the determining factors of evaluation routes. Next, in-depth interviews with the experts are conducted to determine the existing transportation routes and future transportation routes after the completion of the railway. After obtaining the determining factors, the author used the AHP analysis method to determine the weight of these determining factors and then use the TOPSIS method to compare the existing route with the future route. The new routes formed after the completion of the China-Laos railway have better transportation performance. A framework will be proposed for taking advantage of the new transportation routes, which will help Thailand's industrial exporters to improve their trade performance and trade competitiveness.

LITERATURE REVIEW

China-Laos Railway

The China-Laos railway connects Kunming, China, with Vientiane, Laos. The railway has a total length of more than 900 kilometers. The mainline in China has a total length that stretches 508.53 kilometers, while Laos has 414 kilometers. The designed speed is 160 km/h for passengers and a freight speed of 120 km/h. There are 7 stations in the China section and 11 stations in the Laos. There will be 18 trips a day, of which 4 are for passengers and 14 for freight. The passenger fare is 0.04 USD/person /km, and the freight price is 0.07 USD/ton/km. (Huang, 2020). The China-Laos railway adopts the international railway standard, with a track spacing of 1435 mm. The railway has 170 Bridges and 72 tunnels, with a bridge to tunnel ratio of 63%, and a single carriage carrying a weight is 50-60 tons. The planned final freight capacity should reach 19 million tons/year after being put into operation. The head of the construction of the China-Laos railway predicted that the upstream traffic of the line (from Vientiane to Boten) could reach 2.59 million tons/year. In the initial stage, 3.62 million tons/year in the short term and 6.45 million tons/year in the long term (Rusakova & Bylkov, 2018).

Thai Products are Exported to the Main Provinces and Routes of China

Thai products are mainly exported to five areas in China, such as; Guangdong, Jiangsu, Shanghai, Shandong, and Zhejiang (Zhu & Chen, 2013). Guangdong imports reached to $15.2 billion in 2018, accounting for 39% of the total exports, followed by the Yangtze River delta economic circle. The three major economic strong provinces of Jiangsu, Shanghai, Zhejiang, imports accounted for 32%, Jiangsu is $6.01 billion, accounted for 16%, Shanghai is 4.68 billion, accounted for 12%, Zhejiang is 1.36 billion, accounted for 4% (Feng & Qin, 2015). The main export is plastic and rubber products, mechanical, electrical, and plant products. The export amount of plastic and rubber products is 8.11 billion USD, accounting for 26.99%. The export amount of mechanical and electrical products is 6.826 billion USD, accounting for 22.71%, and the export amount of plant products is 3.284 billion USD, accounting for 12.80% (Zhangjie, Wang & Zhang, 2019).

Export Routes for Major Industries from Thailand to China

The five provinces are divided into three regions. The first is Guangdong which is the south China economic center. Shanghai, Jiangsu, Zhejiang is the Yangtze River delta economic center, and Shandong, which is an important economic hub in northern China (Shansong & Xiuying, 2018). After an in-depth interview with the companies, the authors summarize the routes being used in other papers as follows (Table 1):

Table 1
THE MAIN ROUTE FOR EXPORT TRANSPORTATION

R3A	Bangkok-Chiangkong-Houayxay (Laos)-Boten-Mohan (China)-Jinghong-Kunming-	Guangdong
R9	Bangkok-Mukdaharn-SavannaKhet(Laos)-Dansavanh-Lao Bao (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Guangdong
R12	Bangkok- Panom-Tha Kek (Laos)-Na Pao-Cha Lo (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Guangdong
S1	Bangkok- Chabang Port-Port of Guangzhou, Foshan (Shenzhen Shekou Port)-	Guangdong
S2+R	Bangkok- Laem Chabang Port- Port of Zhanjiang-	Guangdong
R9	Bangkok-Mukdaharn-SavannaKhet(Laos)-Dansavanh-Lao Bao (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Shanghai Zhejiang Jiangsu
R12	Bangkok-Nakorn Panom-Tha Kek (Laos)-Na Pao -Cha Lo (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Shanghai Zhejiang Jiangsu
S2	Bangkok-Laem Chabang Port-Shanghai Port-	Shanghai Zhejiang Jiangsu
S3	Bangkok-Laem Chabang Port-Port of Guangzhou, Foshan-	Shanghai Zhejiang Jiangsu
S4	Bangkok-Laem Chabang Port-Hong Kong Port-Qingdao Port-	Shandong
S5	Bangkok-Laem Chabang Port-Kaohsiung Port-Qingdao Port-	Shandong
S6	Bangkok-Shanghai Port-	Shandong
R3A	Bangkok-Chiangkong-Houayxay (Laos)-Boten-Mohan (China)-Jinghong-Kunming-	Guangdong
R9	Bangkok-Mukdaharn-SavannaKhet(Laos)-Dansavanh-Lao Bao (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Guangdong
R12	Bangkok-Panom-Tha Kek (Laos)-Na Pao-Cha Lo (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Guangdong
S1	Bangkok- Chabang Port-Port of Guangzhou, Foshan (Shenzhen Shekou Port)-	Guangdong
S2+R	Bangkok- Chabang Port- Port of Zhanjiang-	Guangdong
R9	Bangkok-Mukdaharn-SavannaKhet(Laos)-Dansavanh-Lao Bao (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Shanghai Zhejiang

		Jiangsu
R12	Bangkok-Nakorn Panom-Tha Kek (Laos)-Na Pao -Cha Lo (Vietnam)-Hanoi-LangSon-Huu Nghi-Nanning (China)-	Shanghai Zhejiang Jiangsu
S2	Bangkok-Laem Chabang Port-Shanghai Port-	Shanghai Zhejiang Jiangsu
S3	Bangkok-Laem Chabang Port-Port of Guangzhou, Foshan-	Shanghai Zhejiang Jiangsu
S4	Bangkok-Laem Chabang Port-Hong Kong Port-Qingdao Port-	Shandong
S5	Bangkok-Laem Chabang Port-Kaohsiung Port-Qingdao Port-	Shandong
S6	Bangkok-Shanghai Port-	Shandong

Source: Wanhai Shipping Co., LTD., Evergreen Marine Co., LTD., OCL Shipping Co., LTD., Baohan International Logistics Co., LTD.
R=road T=train S=ship

Identifying the Determining Factors for Route Selection

The selection of a route is one of the most important factors in transportation because transportation route selection is a complex and multi-criteria decision. This paper has considered many different factors, such as distance, cost, delivery time, security, transportation capability, etc. The authors collected 16 literature reviews through the second-hand data method and summarized the determinant factors of the selected route they adopt in Table 2 (Etoh & Sakurai, 2011; Fareed, 2012; Gong & Wu, 2007; Guan, 2014; Huang, 2020; Jia-ni, 2015; Lei, 2014; Zhu, 2013; Wang, 2014; MaciejHojda, 2018; Cheng, 2011; Zhu, 2009; Liu, 2006; Tian, 2016). Cost and time are the most frequently used factors in other literature, followed by security and transportation capacity, and finally is the distance (Table 2 & Figure 3).

Table 2
SUMMARY OF THE DETERMINING FACTORS

Author (year)	Distance	Cost	Time	Security	Transportation capacity	others
MaciejHojda（2018）		✓	✓		✓	
MaciejHojda（2020）		✓	✓	✓		
Etoh& Sakurai（2011）		✓	✓			✓
Fareed (2012)	✓	✓	✓		✓	
Gong, & Wu (2007)	✓	✓	✓			
Guan (2014)	✓	✓	✓	✓		
Huang (2020)		✓		✓		✓
Cheng (2011)		✓			✓	✓

Jia ni(2015)	✓	✓	✓	✓		
Lei (2014)		✓	✓	✓		✓
Zhu (2009)		✓	✓	✓	✓	
Liu (2006)		✓	✓	✓	✓	
Xie(2009)		✓	✓			
Ji (2012)		✓	✓		✓	
Zang (2013)	✓		✓			
Tian (2016)		✓	✓			✓
Total 16	7	17	17	8	8	5

✓: Determining factors of Other paper selection

RESEARCH METHODOLOGY

Research Flowchart

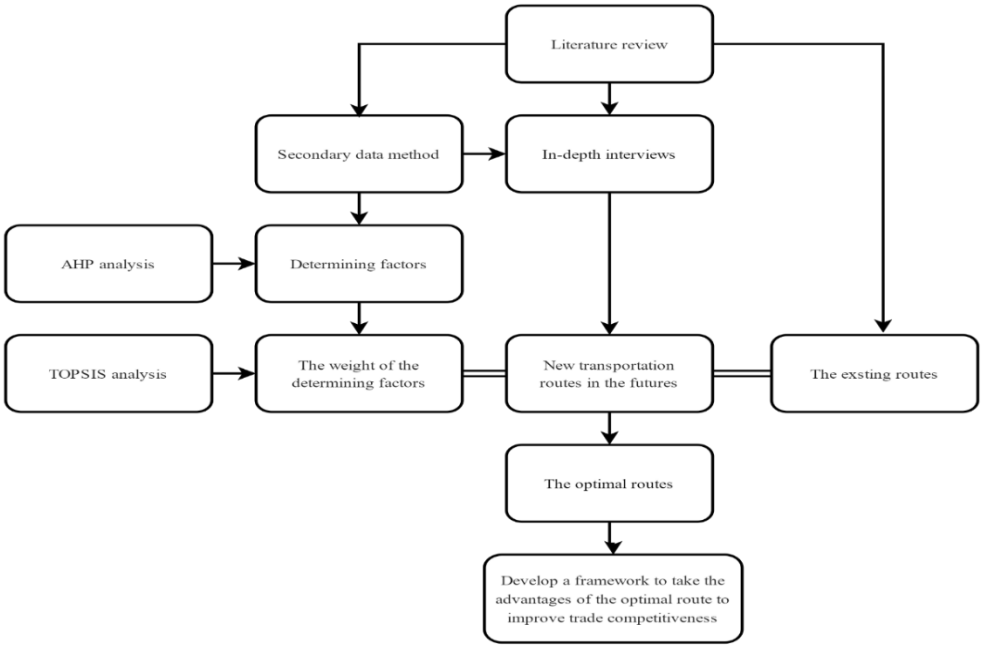

FIGURE 3
RESEARCH FLOWCHART

Frist of all, this paper summarizes the main existing routes of Thailand's export to China through a literature review, the literature review method and secondary data method are combined to summarize the determining factors used in route selection. Then, the author uses secondary data method and in-depth interview method to get the new routes in the future **(**after

the completion of the China-Laos railway**)**. Next, the AHP analysis is used to identify the weight of determinant factors and adopt the TOPSIS method to compare the existing and the new routes to select the optimization of routes. Finally, this study develops a framework to take the advantages of the optimal route to improve trade performance and competitiveness from Thailand to China

RESULT AND DISCUSSION

New Transportation Routes

This study identifies the new routes, resulting from the connectivity that the China-Laos railway will bring through in-depth interviews with experts. In addition, these experts will select the Common routes among the existing routes**.** These experts are respectively the leader of the China-Laos Railway project- Mohan Section **(**China Railway Bureau Group Co**.** Ltd**)** and three logistics companies **(**Evergreen Marine Co**.**, Ltd, Wanhai Shipping Co**.**, Ltd, OOCL Shipping Co**.**, Ltd**)** and export traders in three main industries **(**Pawin Golden Rice Co**.**, LTD, FR Enterprise Co**.**, LTD, Baohan International Logistics Co**.**, LTD**).** The existing routes and new routes are shown in Figure 4**.**

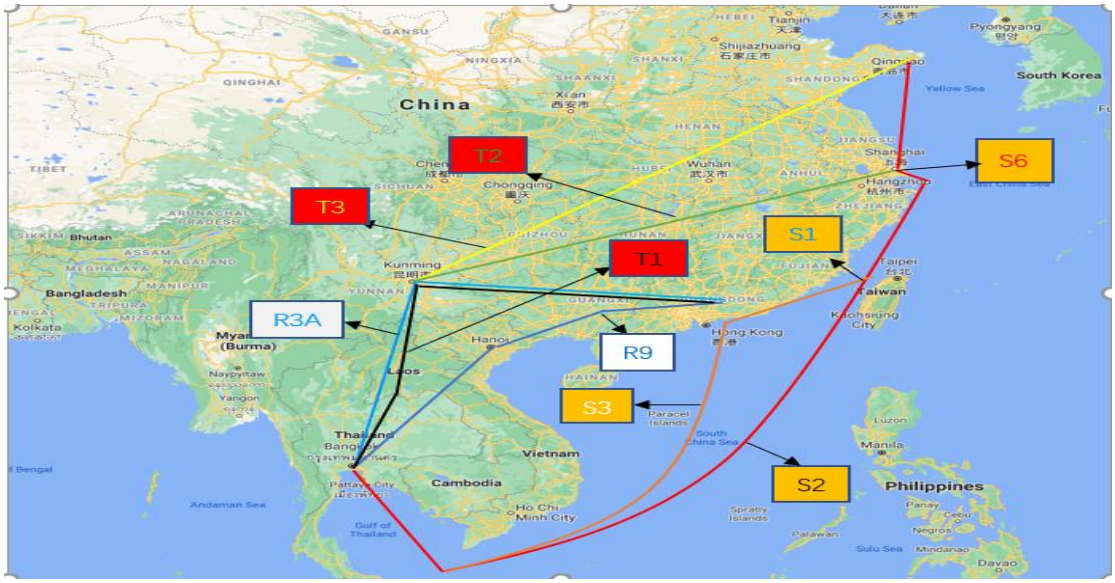

FIGURE 4
THE EXISTING ROUTES AND NEW ROUTES

The Weight of the Determining Factors

The authors send the questionnaire with determining factors to experts for assessment**.** There are five experts involved in this study, including two leaders from a freight forwarding company, two exporters from Thai fruit and rubber industries, and the last one is a teacher with rich experience in the field of logistics**.** After getting the results of the questionnaire, AHP analysis is applied to study the weight of each factor**.** Since the importance of each factor considered in the export of each industry is different, the author summarizes the weight of each industry in Table 3**.**

Table 3
THE PRIORITY OF SIX FACTORS ON AVERAGE FOR EACH INDUSTRY

Industry	Cost	Time	Convenience	Distance	Security	Transportation Capacity
Rubber and Plastics	0.265	0.134	0.108	0.051	0.296*	0.146
Mechanical and Electronic	0.255	0.221	0.102	0.046	0.257*	0.118
Plants	0.234	0.296*	0.094	0.122	0.164	0.09

*：The most important determining Factors

Performance of Each Route

In this section, the authors used the actual performance of each route using the determining factors to calculate the logistics performance**.** Cost, time, transportation capacity, and distance are calculated based on data collected from in-depth interviews and a literature review**.** Safety and convenience are calculated based on the experts' questionnaire **(**5-point scale**).** The performance of each route obtained through in-depth interviews is shown in Table 4**.**

Table 4
THE PERFORMANCE OF EACH ROUTE

	Province	Route	Cost (dollar/t)	Time (hours)	Capacity (tons)	Distance (km)	Security	Convenience
Rubber and plastics	Shandong	S6	232	235	11, 000	7, 255	1.6	2.2
		T3	229	47	1, 800	2, 865	3.4	3.4
	Shanghai Zhejiang Jiangsu	S2	198	175	9, 000	6, 455	1.8	2.4
		T2	220	38	1, 800	2, 745	3.4	3.6
	Guangdong	S1	185	156	7, 500	3, 676	1.8	2.6
		T1	167	34	1, 800	2, 084	3.6	4
Mechanical and Electronic	Shandong	S6	260	225	11, 000	7, 432	1.6	2
		T3	224	47	1, 800	2, 865	3.4	3
	Shanghai Zhejiang Jiangsu	S3	215	165	9, 000	5, 985	1.8	2.2
		T2	227	38	1, 800	2, 745	3	3.2
	Guangdong	R9	218	62	28	2, 186	2.4	1.8
		S2+R	202	137	7, 500	4, 045	2.6	1.6
		T1	211	34	1, 800	2, 635	3.6	3.8
	Shandong	S6	245	225	11, 000	7, 432	1.4	2

Plants		T3	224	47	1, 800	2, 865	3.2	2.8
	Shanghai Zhejiang Jiangsu	R9	298	78	28	2, 499	2.2	2. 2
		T2	227	38	1, 800	2, 745	3	3.4
	Guangdong	R9	244	52	28	2, 186	2.2	1.8
		R3A	289	63	28	2, 558	2.2	1.6
		T1	211	34	1, 800	2, 635	3	3.2

Then, the author used the TOPSIS method to compare these routes, and the final results are shown in Table 5.

Table 5
THE RESULT OF LOGISTICS PERFORMANCE COMPARISON FOR EACH INDUSTRY

Province	**Industry**	**Route (S)**			**The optimal route**
Shandong	Rubber and Plastics	S6(0.714)	T3(0.285)		T3
	Mechanical and Electronic	S6(0.747)	T3(0.253)		T3
	Plants	S6(0.699)	T3(0.301)		T3
Shanghai Zhejiang Jiangsu	Rubber and Plastics	S2(0.710)	T2(0.290)		T2
	Mechanical and Electronic	S3(0.721)	T2(0.268)		T2
	Plants	R9(0.732)	T2(0.279)		T2
Guangdong	Rubber and Plastics	S1(0.742)	T1(0.257)		T1
	Mechanical and Electronic	R9 (0.545)	S2+R (0.489)	T1 (0.237)	T1
	Plants	R9 (0.731)	R3A (0.502)	T1 (0.08)	T1

The author found out that the comprehensive logistics performance of the new routes is obviously better than that of the existing routes in all industries **(**Zhangjie, Wang & Zhang, 2019**).** The main reason is that the new routes get high scores for safety and convenience**.** This proves that the new routes have a higher level of safety and convenience**.** Then, compared with the routes by land transportation, the new route has apparent advantages in time in terms of cost, time, and transportation capacity; compared with other sea transportation, the new routes have huge advantages in terms of distance and time**.** Therefore, the author thinks it is necessary to consider how to use the new routes to give play to its advantages **(**Etoh, Hori & Sakurai, 2011**).**

Framework for Improving Trade Performance

This framework describes the main roles in the new routes and provides advice for those roles**.** This framework will help Thai exporters to improve the trade performance and competitiveness of Thai products**.** The framework is shown in figure 5,

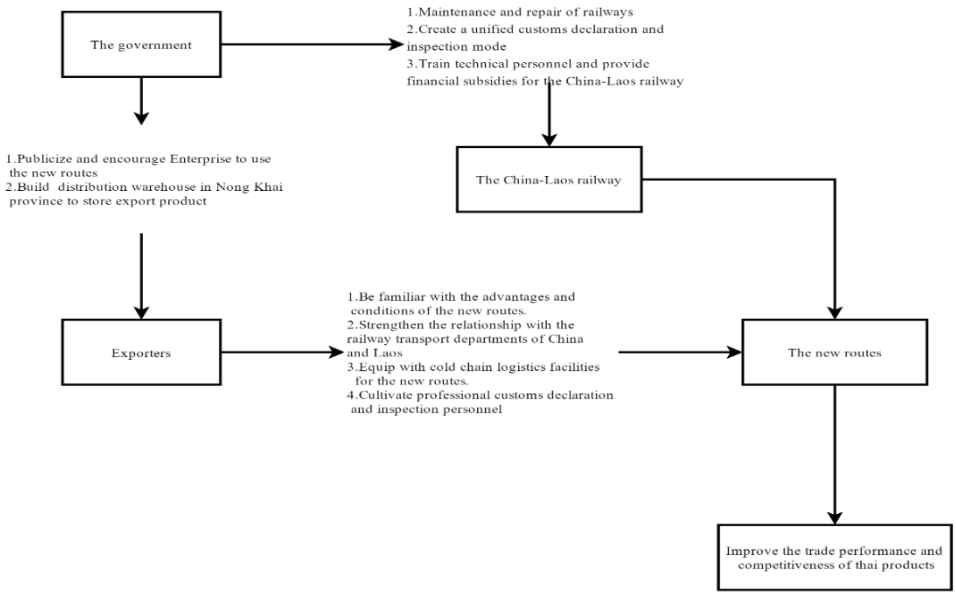

FIGURE 5
THE FRAMEWORK

For the Government

As an important cooperative project of the government, the measures taken by the government are important factors affecting the new routes**.** The new routes will involve three governments**.** The new routes do not offer much advantage in terms of convenience, mainly because rail transport is limited by punctuality and guaranteed full loads, so small goods need to be lumped together for easy transport. In addition, many cold-chain goods are limited by time and need to be stored before shipment, so it is necessary to build a warehouse at the starting point of the railway. The Thai government should invest in the distribution warehouse in Nong Khai Province (Important boundary) to facilitate the loading and optimization of goods by enterprises**.** Thai government also needs to publicize and introduce the new routes to Thai exporters in Thailand. Since few companies know about the new routes after the railway is built, the government needs to publicize the advantages of railway in terms of cost, time and safety, so that companies can try to use the new routes. Since the main section of the new routes is in Laos, so the Lao government needs to maintain the quality of the railway and simplify customs clearance to make it more convenient for Thai exporters**.** Encourage and train railway technicians to master railway technology to reduce railway failure rate and maintenance times**.** The Chinese government establishes the main part of the new routes**.** They can also appropriately subsidize the new routes like the China-Europe railway to reduce the transportation cost, the cost reduction will allow more exporters to use the new routes and improve the performance and efficiency of the routes, so that the countries can get benefit in other ways. Additionally, China must help Laos train technical railway personnel so that Laos can manage the China-Laos railway independently to reduce the management cost**.** The Chinese government needs to be responsible for the maintenance and management of railways, which will help improve the transportation efficiency of new routes**.**

For the Exporters

The purpose of this paper is to improve the trade competitiveness of Thai exporters**.** The study has proven that the new route better than other routes in terms of logistics performance. Exporters need to understand that new routes are superior to all other routes in terms of safety and time, shorter transport time and safe transport of goods with low damage will be able to improve the trade competitiveness of goods. If exporters consider these two factors to be the most important for transport their goods, the new routes should be preferred. Considering the size of exporters, the author will put forward some suggestions for exporters of different sizes companies**.** The authors found that exports of plastics and rubber, mechanical and electrical are large enterprises; the customs declaration and inspection of railway transportation will be different from other transportation modes. The important factors that affect the convenience of railway transportation are customs declaration and inspection; large enterprises must first be familiar with the railway transport customs clearance and inspection procedures. Enterprises shorten the customs declaration inspection and loading and unloading time, can be very good to shorten the total time. Then, the running time of railway transportation is also an important factor affecting convenience, if the enterprise cannot load in time, Failure to load the goods on time will cause damage to the goods and increase the transportation time. Exporter cannot fill the goods will increase the transportation cost. They must consider using the distribution warehouse established by the government to guarantee the quality of the products**.** The railway system as part of the new routes cannot provide **"**door to door**"** service. Hence, the exporters need to be familiar with the distribution of products to customers after unloading from the railway**.** For small and medium-sized enterprises, they have high requirements for transport time, and the new routes will suit them well, but they will be limited by the full capacity of the trains, which will increase costs if they cannot fill up. The author suggests that they must try to form a chamber of commerce or groups to gather their products in the distribution warehouse and transport them together to reduce transportation costs**.** Some small companies who are exporting plants must also understand the cold chain logistics of new routes, because a lot of plants need to be transported in the cold chain. If the quantity and volume of the product is very small, there will be many third-party logistics companies, which are also a good choice. They can help small and medium-sized businesses consolidate goods, reducing transport costs. Can bring preferential transport prices and professional transport services to Thai enterprises**.**

CONCLUSION

Trade performance has always been an important factor that affects Thai products export to China. The China- Laos railway is completed by 2021 will provide new transportation connectivity between Thailand and China. However, the studies about this subject are very few, and the Thai industries' understanding of the potential benefits that this railway connectivity will bring is limited. This paper provided the analysis results of the effect the China-Laos railway may have on the exports from Thailand and China, the author proves that the new routes is superior to the existing routes in terms of transport performance, Then, the framework for building a competitive advantage from the connectivity provided by the railway was developed. Next, the author puts forward relevant suggestions to the government and exporters, so that the advantages of the new routes can be further exploited. Through this paper, Thai exporters will understand the specific situation of the new routes and its advantages, and be able to make

reasonable use of the routes according to the author's suggestions. Thus, improving trade performance and export competitiveness.

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