FACTORS ASSOCIATED WITH THAI EXPORTER'S INTEREST IN USING NEW DAWEI DEEP SEAPORT

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KEYWORDS

Port selection, Decision factor, Pearson Chi-Square test, t-test.

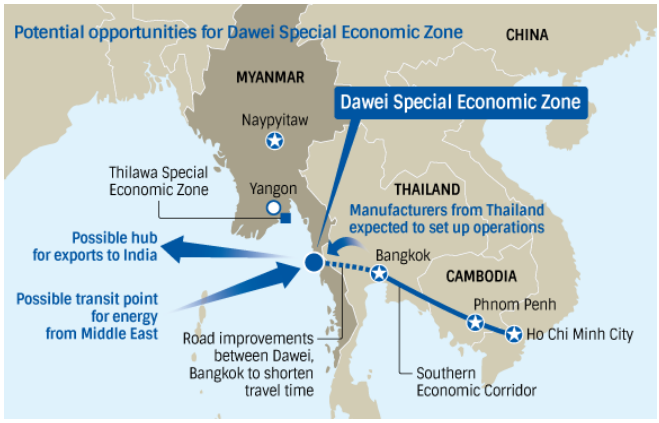
ABSTRACT

Dawei deep seaport in a part of the Dawei Special Economic Zone (Dawei SEZ) in Myanmar aims to support the new economics along the GMS Southern Corridor. The Dawei seaport can serve the potential new industries along the new industry zones. The new port will be the alternative route for Thai exporters in the future as it is under construction. The exploratory study by employing survey was selected and analyzed to identify the significant influencing factors. The results of hypothesis testing by Pearson Chi-Square test confirm the relation between the interest of using new Dawei deep seaport and the location of manufacturer (p-value = 0.027). In addition, the results of t-test confirm the significant six decision variables of Time for transportation (v7), Reliability of service (v10), Port size and capability (v15), Facility (v25), Professionals and skilled labors in port operation (v30), and Port accessibility (v31) are more important for exporters who are interested in Dawei seaport than the exporters who may not be intend to use the new seaport, p-value (1-tailed) < 0.05.

INTRODUCTION

The concept of transportation along a land bridge to a port can support the policy of Economic East-West Corridor sub-region GMS (Greater Mekong Sub-region) or GMS Southern Corridor. Therefore, the GMS Southern Economic Corridor links Dawei, Myanmar through Bangkok-Chonburi and Trat, Thailand to Phnom Penh and Sihanoukville, Cambodia to Nam Can, Vietnam. One of the big project is the development of the Dawei Special Economic Zone (Dawei SEZ), see Figure 1. In addition, the Dawei deep seaport will be a Western gateway through the Indian Ocean and the port can support to increase the competitiveness of countries in this region. The advantages of the Dawei seaport can support exporters to ship their products to the Indian Ocean instead of shipping via Malay Peninsula. The establishment of this project can also stimulate the development of transport routes and infrastructures across the corridor and then follow by the development of significant economic activity (Cabral & Ramos 2014) as the hinterland of the Dawei seaport.

Dawei city is in the southeast of Myanmar, about 360 km from Yangon and about 138 km to the Myanmar-Thailand border Baan Phu Nam Ron. The Dawei SEZ is officially demarcated by the Republic of the Union of Myanmar under the SEZ Law, enacted in January 2014. The Dawei SEZ is managed by Myandawei Industrial Estate Company Limited (MIE). The Dawei SEZ has also been supported by the joint cooperation between the governments, the Republic of Myanmar and Thailand (Myandawei Industrial Estate Company Limited, 2016).



Source: Motoka et. al. (2015)

Figures 1: GMS Southern Corridor and Dawei SEZ

The Dawei deep seaport can be an alternative route for exporters not only in the Dawei industrial estate but also in Thailand. The Dawei deep seaport is a competitive port of seaports in Thailand since Dawei is not far away from Bangkok. In order to understand the current Thai exporters' perceptions of using Dawei deep seaport, this research aims to explore their Thai exporters' opinion by survey. All relevant factors are investigated in order to identify significant relation between those decision factors and Thai exporters' interest of using Dawei seaport.

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The structure of the remaining of this paper is therefore organised as follows. The Section 2 shows critical literature review of possible factors that are relevant to the export route selection. The data collection and instrument construction are described in Section 3. Results analysed from obtained survey data are described in Section 4. Finally, in section 5, the interpretation of the results are defined.

RELEVANT FACTOR IDENTIFACTION

This section shows the relevant factors in decision making of exporting routes. According to the critical review, two main distinct sources were specified as factors related to internal factors and external factors.

Internal factors

The characteristics of particular companies can influence the port choice selection. This research defined the 4 characteristics as the internal factors as Size, Type of business, Product type, and Manufacturer location.

Size
Size of a company can influence the decision to remodel the exporting route via the new port (Pokharel 2005). First, the large company may not be flexible to make change since they have invested to facilities along the route and it is difficult to move or change. Second, some global companies may not be interested in changing to the new port because their headquarter branches may have the contracted freight company that won the global bidding for all branches in the region.

Type of business
Two main types of business are relevant to the export activities as Import-Export, Production for export or both activities. Different types of business can perceive criteria to select seaport for export differently (Kent & Stephen Parker 1999; Meixell & Norbis 2008).

Product type
Some products require the special needs for transportation especially via seaport. Different products can come with different sizes and weights so those are relevant to the availability of mode of transportation (Meixell & Norbis 2008).

Manufacturer location
The distance to the port is a critical factor for selecting the port and manufacturer location since it leads to overall cost reduction (Manic 2013). The location has been confirmed by recent research (Chang et al. 2008; Lee Lam & Song 2013; Lirn et al. 2004; Park & Min 2011).

External factors

The external factors were reviewed from different papers such as the competitiveness of ports, the efficiency of logistics performance, or the influential attributes in mode choice decision etc. There are 7 criteria and 31 factors were defined as below.

Cost
Transport costs are an important factor in supply chain costs and it is defined and needs to be reduced to increase competitiveness. Operators want to spend in the most cost-effective way (Foster 1978). The cost of particular processes during export route is defined into 6 factors as:

1. Transportation cost which includes inland transportation cost to pay for the vehicle charges and sea freight shipment cost.
2. Terminal handing charge which includes the dock charges, berth fees, electricity, etc.
3. Multimodal operation cost which includes cost of worker, cargo loading or discharging fees, cost transshipment, etc.
4. Customs regulation cost which includes customs fees, costs and expenses, port authority documents, cost for special permits, etc.
5. Insurance cost which is the cost to pay for the coverage of unexpected events for export shipment along either inland or sea transport.
6. Cargo storage fee or container storage fee which is employed when the waiting time is longer than the allowance.

Time
Time is one of the main criteria for a seaport selection. The individual activities require either different operating or waiting time (Kofjac et al. 2009; Kopytov & Abramov 2013).

7. Time for transportation refers to the time duration of the transportation to the destination.
8. Transferring time means time spent in transit both unloading and loading from one mode to another until products reach the destination countries.
9. Customs service time is the time to spend for conducting customs clearance. This may include the crossing border time.

Reliability
Reliability of the operations or services along the routes and there were explained in literature (Kopytov & Abramov 2013; Yeo et al. 2008; Manic 2013; Panayides & Song 2012; Tongzon 2009).

10. Reliability of service is the delivering accuracy.
11. Safety in the export route is the secure throughout transport routes. The product and package are not damaged or stolen during transportation.

12. Safety during handle transferring means the safety of the product from damage and lost in the process of loading and unloading at each point as well as the security of keeping products in a cargo.

13. Traffic condition considers the traffic along the route both inland and in the sea.

14. Capability to handle transferring from one mode to another is a critical competitiveness of the ports. The available facilities along the transport network should be in a good condition so it will take less time and reduce the likelihood of accidents.

Port Efficiency

The port performance can attract entrepreneurs to choose the port (Langen et al. 2007; Manic 2013; Tongzon 2009).

15. Port size and capability indicate the ability of the port to handle number of cargos, space of container yards to store containers during waiting to transport, etc.

16. Frequency of ship visits can cause a variety of the price competition and flexibility for the operators to have more schedules and can reduce waiting time.

17. Inter-modal link is the ability to link the port with inland. If the connection is inconvenient, it can lead to congestion and higher costs.

18. Port facility and infrastructure is necessary element to provide efficient services. For example; all necessary equipment e.g. cranes should be sufficient.

Existing Resources

Existing resources were defined in literature (AEC, ENRICH, PCBK, CMCL & PTL, 2000).

19. Infrastructure availability means facilities, resources, or devices for existing operators invested to support the current use of logistics. If they decide to change the route of transport, operators may be concerned about the possibility of using their available resources within the new route.

20. Familiarity of the routes is the confidence of along the routes that exporters can cope with unexpected problems during the transport process.

21. Balancing between inbound and outbound represents the utility of the vehicle transporting loads both inbound and outbound in the same route.

Legislations and Basic Factors

Legislation and basic factors are related to the convenience of the transport operations and logistics. There are factors defined in the literature (Park & Min 2011; Saeed & Aaby 2013; Chou 2010).

22. Customs regulation is crucial to the port selection, especially for exporting to destination country. When the customs regulation rules of particular countries along the route are different, it will be difficult to cope with too many rules.

23. Government policy on investment means the government policy that can encourage or discourage relevant projects to promote the establishment of new businesses or to encourage existing businesses.

24. Political condition means a factor that may affect the delay of the process and the safety of transportation along the route.

25. Facility is the necessary infrastructure such as electricity supply system, phone line or Internet including transportation links such as roads for transportation from one place to another.

Port Service

This characteristic arises after the port was operated (Panayides & Song 2012; Langen et al. 2007).

26. Port customer service quality is the service at the port to meet customers' needs in time.

27. Port flexibility is the port service that can cope with the special requirements from customers. The service can be adjusted to meet the customers' needs.

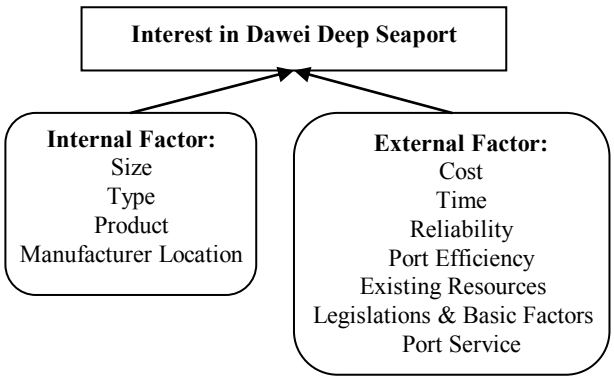
28. Efficiency of port management means the operation capability to manage port efficiency by concerning about speed and waiting time by providing the schedule appropriately.

29. Port information system is relevant to information sharing in the whole supply chain to enhance the logistics accuracy, reduce waiting time and increase speed of service.

30. Professionals and skilled labors in port operation are needed since labors contribute significantly to the efficiency of port services.

31. Port accessibility is channel to access to the port services such as customers service office hours, the working hours of customs at the port, etc.

According to the literature review above, the conceptual framework for this research is defined as Figure 2.



Figures 2: Conceptual framework

RESEARACH METHODOLOGY

Data collection

Data for this research were collected by mean of questionnaire that were sent via email with both a copy of questionnaire and a link to the online questionnaire to the members of Thai National Shippers' Council during October 2015 and May 2016. Therefore, Quota

Sampling was employed for this study with 150 samples and only one representative defined as a respondent for a company. The final returned questionnaires were 157 samples since extra 5% were prepared to prevent missing and incomplete questionnaire. The respondents are the staff who have main tasks relevant to the export process in the companies that have experience in exporting through major ports of Thailand.

Research instrument

Questionnaire is a structured questionnaire and the questionnaire is divided into three parts as:

Part 1: Overview and characteristics of the establishment;

Part 2: Factors influencing the choice of exporting ports which were evaluated by 5 levels of important factors (Table 1);

Part 3: The interest to the Dawei deep seaport.

Table 1: 5 Point Different Levels of Important Factors for Export Routing Decision Making

Level	Meaning
1	Insignificant
2	Slightly important
3	Fairly important
4	Very important
5	Vital

Statistical analysis

Data analysis was performed by using the Statistical Package for the Social Sciences (SPSS) Version 19.0 for Windows.

Test of dependence

Test of dependence was employed to investigate the factors related to the exporters' interest in the Dawei deep seaport as the main purpose of this research. Pearson Chi-Square (χ^2) was selected as the most suitable techniques for collected data of this research within nominal scales. The Pearson's chi-square test using χ^2 statistic plays the important role for testing of independence between two categorical variables. Consequently, the null hypothesis asserts the independence of variables under consideration. χ^2 statistic can be calculated as follows:

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{\left(O_{ij}-E_{ij}\right)^2}{E_{ij}} \quad (1)$$

$$E_{ij} = \frac{(r_i)(c_j)}{n} \quad (2)$$

Where:

O_{ij} = Observed frequency in i[th] row and j[th] column

E_{ij} = Expected frequency in i[th] row and j[th] column

r_i = Total frequency in i[th] row

c_j = Total frequency in j[th] column

n = Total number

r = Number of rows

c = Number of columns

The χ^2 can then be used to calculate a p-value by comparing the value of the statistic to a chi-squared distribution with (r-1)(n-1) degree of freedom. The limitations of the test should be ensured that the number of cells that $E_{ij} < 5$ should not be more than 20%.

Independent t-test

The independent-samples t-test is an inferential statistical test that determines whether there is a statistically significant difference between the population means in two unrelated groups. One tailed test of hypothesis can be employed for this study to compare the mean score of 'interested group' (group 1) will exceed the mean scores of 'not interested group' (group 2) to use the Dawei seaport in particular factors. The relevant decision factors to the interest of using Dawei seaport can be identified from the excess of the sample means which is large enough to be statistically significant evidence as defined by the hypothesis below.

H_0: $\mu_1 - \mu_2 \le 0$

H_1: $\mu_1 - \mu_2 > 0$

Two cases of test statistic are defined as:

Case 1: $\sigma_1^2 = \sigma_2^2$

$$t = \frac{\left(\bar{x}_1 - \bar{x}_2\right) - \left(\mu_1 - \mu_2\right)}{\sqrt{\frac{\left(n_1-1\right)S_1^2 + \left(n_2-1\right)S_2^2}{n_1+n_2-2}} * \sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \quad (3)$$

$$df = n_1 + n_2 - 2$$

Case 2: $\sigma_1^2 \neq \sigma_2^2$

$$t = \frac{\left(\bar{x}_1 - \bar{x}_2\right) - \left(\mu_1 - \mu_2\right)}{\sqrt{\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}}} \quad (4)$$

$$df = \left[\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}\right]^2 \Bigg/ \left(\frac{\left[\frac{S_1^2}{n_1}\right]^2}{n_1-1} + \frac{\left[\frac{S_2^2}{n_2}\right]^2}{n_2-1}\right) \quad (5)$$

Where:

n_i = Number of sample for group i, i = 1 and 2

$\bar{x}_i$ = Sample mean of group i, i = 1 and 2

S_i = Sample standard deviation of group i, i = 1 and 2

RESULTS

Characteristics of respondents

Table 2 shows the characteristics of the respondents. The respondents are working in companies with different sizes. Most of the respondents work in the medium size company with 50-200 employees. Most of their companies mainly produce the products for export (and also domestic market) (68.2%). They work in different industries and the majority of product is Food/Beverages industry (17.8%). Furthermore; their company is located in different areas of Thailand and the majority of their manufacturers is located in the outskirt around Bangkok (39.3%).

Table 2: Respondent Characteristics

Characteristics	Frequency	%
Size		
< 50 employees	32	20.5
50-200 employees	47	30.1
201-500 employees	32	20.5
501-1,000 employees	21	13.5
> 1,000 employees	24	15.4
Total	156	100.0
Type of Business		
Import-Export	30	19.4
Production for export	105	68.2
Both	19	12.3
Total	154	100.0
Product Type		
Agriculture and agricultural products	13	8.9
Automotive and automotive parts	7	4.8
Chemical/Petrochemical	5	3.4
Construction materials	4	2.7
Electrical products /Electronic equipment and parts/Software	21	14.4
Food/Beverages	26	17.8
Furniture	11	7.5
Leather	2	1.4
Plastic/Plastic packaging	7	4.8
Rubber and rubber products	7	4.8
Textile and clothing	13	8.9
Other	30	20.5
Total	146	100.0
Manufacturer Location		
Bangkok	22	15.7
Outskirt	55	39.3
East	30	21.4
Middle	3	2.1
West	8	5.7
North	10	7.1
North East	4	2.9
South	8	5.7
Total	140	100.0

Table 3: Number of Samples, Standard Deviation (S.D.), Mean, and Rank of Export Routing Decision Factors

Factors	n	S.D.	Mean	Rank
Cost				
1. Transportation cost	156	0.807	4.519	**4**
2. Terminal handing charge	156	0.925	4.269	18
3. Multimodal operation cost	156	0.910	4.173	23
4. Customs regulation cost	156	0.980	4.019	27
5. Insurance	154	1.113	3.948	29
6. Cargo storage fee or container storage fee	155	1.308	3.813	31
Time				
7. Time for transportation	156	0.686	4.481	**5**
8. Transferring time	155	0.966	4.187	22
9. Customs service time	156	0.818	4.314	15
Reliability				
10. Reliability of service	156	0.540	4.724	**2**
11. Safety in the export route	156	0.528	4.750	**1**
12. Safety during handle transferring	154	0.593	4.708	**3**
13. Traffic condition	154	0.773	4.318	14
14. Capacity to handle transferring from one mode to another	152	0.742	4.421	9
Port Efficiency				
15. Port size and capability	154	0.786	4.273	17
16. Frequency of ship visit	154	0.727	4.344	13
17. Inter-modal link	154	0.831	4.364	12
18. Port facility and infrastructure	154	0.934	4.149	25
Existing Resources				
19. Infrastructure availability	152	0.887	3.967	28
20. Familiarity of the route	152	0.897	3.868	30
21. Balancing between inbound and outbound	152	0.848	4.059	26
Legislations and Basic Factors				
22. Customs regulation	154	0.746	4.409	10
23. Government policy on investment	154	0.893	4.266	19
24. Political condition	154	0.920	4.234	20
25. Facility	154	0.838	4.208	21
Port Service				
26 Port customer service quality	155	0.706	4.477	6
27. Port flexibility	156	0.687	4.308	16
28. Efficiency of port management	156	0.675	4.449	7
29. Port information system	156	0.685	4.378	11
30. Professionals and skilled labors in port operation	156	0.777	4.167	24
31. Port accessibility	156	0.701	4.429	8

The prioritization of factors influencing the export route choice

The respondents evaluated level of importance of decision factors in 31 factors. The number of valid answers by respondents in particular questions was counted. Furthermore; standard deviation, mean, and rank sorted by mean are shown in Table 3. Respondents

evaluate the importance of each factor more than four score, except only 4 factors as Insurance (v5), Cargo storage fee or container storage fee (v6), Infrastructure availability (v19), and Familiarity of the route (v20). In addition, the respondents defined the top three of the most important factors in reliability criteria as Safety in the export route (v11), Reliability of service (v10), and Loss and damage during handle transferring (v12) as 4.750, 4.724, and 4.708 respectively. The forth important factor is Transportation cost (v1) and the average score is 4.519. The fifth rank is Time for transportation (v7) and the average score is 4.481.

The interest of using new Dawei deep seaport

Table 4 shows that 25.34% of the respondents are interested in using the Dawei seaport. However, the majority of respondents are still unsure since they need more concrete information of the seaport when the seaport can commercially be operated.

Table 4: Interests in Dawei Deep Seaport

Openions	Frequency	%
Interest	37	25.34
Not interest or Uncertain	109	74.66
Total	146	100.00

The dependent factors associated to the interest of using Dawei deep seaport

Table 5 describes the result of Pearson Chi-Square test of independence. Under the condition of Pearson Chi-Square test, number of cells which show the expected count (see Equation (2)) of particular cells should not be less than 5 more than 20% of all cell in the contingency table. Therefore, the category of variable are adjusted by reducing the levels of importance for decision factors into 3 groups as fairly to lower (≤ 3), very important (4), and vital (5). However, after some cells are merged, the remain classes are not relevant as some variables still show number of cells that $E_{ij} > 5$ is a bit greater than 20% as shown in the remarks of the Table 5.

Table 5: Pearson Chi-Square and p-value for Test of Independence

Factors	Pearson Chi-Square	p-value
Size	1.954	0.751
Type	1.344[a]	0.563
Product	5.956[b]	0.669
Location	12.453[c]	0.027*

[a] 1 cells (16.7%) has expected count less than 5.
[b] 4 cells (25.0%) have expected count less than 5.
[c] 3 cells (25.0%) have expected count less than 5.
* p-value < 0.05

Table 6: t-test and p-value for Test of Mean Difference

Factors	$\bar{x}_1$	$\bar{x}_2$	t	Sig (1-tailed)
Cost				
1. Transportation cost	4.622	4.481	0.899	0.185
2. Terminal handing charge	4.297	4.231	0.367	0.357
3. Multimodal operation cost	4.135	4.176	-0.232	0.409
4. Customs regulation cost	4.027	4.000	0.144	0.443
5. Insurance	4.000	3.925	0.35	0.364
6. Cargo storage fee or container storage fee	3.811	3.757	0.212	0.416
Time				
7. Time for transportation	4.703	4.389	2.85	0.003*
8. Transferring time	4.351	4.103	1.34	0.091
9. Customs service time	4.297	4.306	-0.055	0.478
Reliability				
10. Reliability of service	4.838	4.667	1.869	0.033*
11. Safety in the export route	4.811	4.713	0.95	0.172
12. Safety during handle transferring	4.838	4.682	1.7	0.465
13. Traffic condition	4.324	4.327	-0.019	0.493
14. Capacity to handle transferring from one mode to another	4.459	4.419	0.289	0.387
Port Efficiency				
15. Port size and capability	4.486	4.196	1.977	0.025*
16. Frequency of ship visit	4.432	4.308	0.901	0.185
17. Inter-modal link	4.514	4.336	1.159	0.124
18. Port facility and infrastructure	4.378	4.075	1.761	0.040
Existing Resources				
19. Infrastructure availability	4.000	3.981	0.111	0.456
20. Familiarity of the route	3.946	3.822	0.712	0.239
21. Balancing between inbound and outbound	4.054	4.084	0.186	0.427
Legislations and Basic Factors				
22. Customs regulation	4.486	4.346	0.974	0.166
23. Government policy on investment	4.351	4.215	0.804	0.212
24. Political condition	4.297	4.150	0.831	0.204
25. Facility	4.417	4.159	1.665	0.049*
Port Service				
26 Port customer service quality	4.568	4.495	0.574	0.284
27. Port flexibility	4.324	4.324	0.002	0.499
28. Efficiency of port management	4.514	4.444	0.542	0.294
29. Port information system	4.514	4.352	1.25	0.107
30. Professionals and skilled labors in port operation	4.378	4.120	1.766	0.040*
31. Port accessibility	4.595	4.370	1.706	0.045*

* p-value < 0.05

The hypothesis is determined by considering the p-value which is shown as Exact Sig. (2-sided) in the SPSS output. If p-value < 0.05, dependence between both variables is significant. For internal factors**,** only Location of the manufacturer is significantly dependent on the interest of using new Dawei deep seaport at a significance level of 0.05 (p-value = 0.027). On the

other hand, p-value of Size, Type of business, and Product type is greater than 0.05, so there is no relationship between those internal factors and the interest of the Dawei seaport.

The results of statistical testing of means in Table 6 are also confirmed that the mean score of the importance of Time for transportation (v7), Reliability of service (v10), Port size and capability (v15), Facility (v25), Professionals and skilled labors in port operation (v30), and Port accessibility (v31) given by Thai exporters who are interested in using Dawei ($\overline{x}_1$) exceeds another group ($\overline{x}_2$). Those are significant external factors since t-value is positive and the p-value (1-tailed) < 0.05 at 5% level of significance. In other words, the data provide sufficient evidence that Thai exporters who are interested in Dawei seaport emphasize those 6 external decision factors more than Thai exporters who are not interested in Dawei seaport.

CONCLUSIONS AND FURTHER STUDIES

It is clear that Dawei deep seaport is under construction so it is unable to compare their performance indicators with the standards of general seaport. At the early point of Dawei seaport construction, if they can define the influencing decision factors of their potential customers, they can provide the proper policies to meet their future customers' expectation. Therefore, this study used survey to explore the relationships between Thai exporters' perceptions of decision factors and their interest in using new export route via the Dawei seaport.

There are only one internal factor and six external factors which are significantly relevant to the interest of using new export route via the Dawei seaport. It is found that location and time are highly significant because the location factor is a concordance factor to the time for transport. Any seaport would directly affect the industries in the hinterland of the port, manufacturer who are in the Lower Mekong sub-region (GMS Southern Corridor) would show their interest to the Dawei seaport. The respondents prioritise the time of transportation as the important factor for their company, they will be interested in the Dawei seaport since they can save time 2-3 days via the Malay Peninsula and they agreed to the important of time of transportation to the export process. Furthermore, if the Dawei seaport project developer would like to be successful and maintain their potential customers such as Thai exporters, they should be able to maintain their expectations of the six significant factors as the Time for transportation (v7), Reliability of service (v10), Port size and capability (v15), Facility (v25), Professionals and skilled labors in port operation (v30), and Port accessibility (v31).

Interestingly, some important factors relevant to cost are not significantly relevant to the interest of Dawei seaport. Although the exporters who are not interested in Dawei seaport think that those factors are very important (high rank), they may not prioritise the importance of the cost higher than the exporters who are not interested in Dawei seaport large enough to be statistically significant for many reasons. First, they may have to pay higher cost of inland transport so they may not ensure that the overall cost will be decreased. Second, the Dawei SEZ and the deep seaport project has been delayed so it can affect Thai exporter' confidence in this project. Finally, a little information has been promoted and passed to Thai exporters so it is unclear to the advantages of using Dawei seaport.

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