

# Logistics Development and Local Supports: A Case of Pak Bara Port in Thailand

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**Abstract**— Governments usually use Logistics development to drive economic and trade development at the national and international stage. However, in various cases there are some negative impacts incur from such project in the development area. Such conflict has been discussed widely but seldom in academia. To understand the underlying reason for such conflict, this study aims to develop and examine the logistics on resident supports in the deep-sea port project. The author test the model with the case of Pak Bara Deep Sea port on the West Coast of Thailand according the on-going attempt of the government for the project but lacks of supports from the local community. A research model was developed under the concept sustainable development and related studies on logistics impacts and social supports. The model was empirically tested using the Structural Equation Model (SEM) technique to explain the endogenous latent variable (support for the Pak Bara deep-sea port) and logistics impact as one of the exogenous latent variables together with economics, environment, social and culture, technology, and trust. Survey data were collected using self-administrative questionnaires from 310 residents in Satun province, where the project located. The study found that perceived impacts on environment, logistics, and trust in government significantly affect the resident supports. The path analysis shows that logistics aspect affects the resident supports the most. Moreover, the path analysis of each item shows that satisfying in transportation affects the resident supports the most. Contrast to many believe, it was also found that logistics impacts is critical to local residents as well as social impacts, whilst economic and environmental impact are more concerned by outsiders.

**Keywords**— *Pak Bara deep-sea port, Conflict, Structural Equation Model, logistics development, Support*

## 1. Introduction

Logistics development is the key factor to make the society moving especially in economic [5], [26]. Ref. [14] indicated that implying the economic development can cause more demand of logistics infrastructure and leads to logistics development. Moreover, the improvement of railway transportation can lead more develop in roadway and waterway transportation as well, and also give a feedback effect to the economic development. The economic benefit from logistics and supply chain is not only from trade but also in services, especially cross-border activities [18], [19], [21], [24].

From the 11th Thailand national plan, the development of marine transportation plan was discussed for developing the logistics system in SEA region, especially in Thailand. For improving the quality of logistics system in Thailand, Thailand should have the main port on the west coast of Thailand (Andaman sea) for more competitiveness from the Malakka route in Malaysia with the shortest route [16]. Therefore, Pak Bara deep-sea port in Satun province was selected. This project is a part of government plan project to connect the eastern and western coasts of Thailand [15]. In addition, there is land-bridge project which propose to connect the Songkhla port in the gulf of Thailand and Pak Bara port in the Andaman sea with 142 kilometres of rail way to connect between 2 ports [16]. These projects were considered to increase the export of Thailand and being smoothly transportation in country.

The marine department of Thailand specified the purpose of this project are as follow; to be a main port in Andaman sea, to be an East-West economic

corridor, to develop the transportation system with multimodal transportation, and to develop social-economic in the South of Thailand [15].

However, this project has not been approved until now (2016) because there are many environment groups in Satun province have stepped up their campaign to against this project. It seems to be more difference point of view between local residents in terms of the growth of economics side and sustainable development side. Hence, there are many incident in Satun province, such as in 2013 the local resident taking part in the march from Langko district (Satun province) to Chana district (Songkhla province) to take protesters in this project [12], [4].

From this situation lead to two research questions of this study: what are the factors affecting support for the Pak Bara deep-sea port project in perspective of local resident?, and how to suggest the port operation to getting more support from local resident?.

## 2. Literature Review

The principle of sustainable development consists of economic growth, social equity, and environment protection [7]. However, there are many articles show the logistics development and sustainable development. Ref. [3] indicated that environment is the main key which should be concerned in term of logistics development. The stakeholders should try to decrease the environment impact from the project by relying on the new energy technology and relying on restructure their process of the companies. Moreover, [6], [7], [10], [17] mentioned that the quality of life is the main point to get sustainable development. In economic term, the financial performance of supply chain companies is related to the environment by minimizing the waste can increase the financial performance of the companies and also the revenue [20]. In addition, [3] studied about the framework of sustainable supply chain management and found that the good logistics goal can decrease the negative environment impact. Increasing of efficiency of transportation and logistics system can increase the positive environment impact and decreasing the cost of operation as well.

There are many impacts that can happen by port operation; economics, environmental, social, and logistics. Ref. [25] specified the logistics impact from Dawei port operation in Myanmar. The result found that if the Dawei construction is delayed and reduced the size to 75 percent, the transportation

from China to Europe has to pass the Malacca strait and cannot reduce the cost and time of shipping. Ref. [22] studied the economic impact of port in China found that the port will affect the economy of the community and neighborhood area.

The study of green port is becoming more popular, it can lead to sustainable growth in port. There are several studies about green port operation. Ref. [2] studied Greek port, [27] studied the China port in the gulf of Kaohsiung, and [22] studied 4 Taiwan's ports, etc. The result was similarity found that the important thing for sustainable growth in port is making the role for stakeholder whether it is port operator, logistics provider, or people who use the port, etc. The Actions of these individuals have an important part to make port operation success.

Ref. [22], [8], [13] studied the factors that can lead the port to be sustainable. He found that there are 5 important factors; improving the green technology, having social responsibility, improving tax policy, improving waste management, and improving the transportation system around the port. These can lead the port to be sustainable growth port.

## 3. Methodology

A research model of this study was developed under the sustainable development [1] and related studies about impact of port operation, logistics impact, and social support concept [23], [27], and [1]. Thus, there are 5 hypothesizes as follow: economic impact, environment impact, social and culture impact, logistics and technology impact, and institutional trust have an effected on the support of Pabara deep-sea port. Therefore, the exogenous latent variables in this study are economic impact (ECN), environment impact (ENV), social impact (SOC), logistics impact (LOG), and trust (TRS). The endogenous latent variable is the support of local resident (SUP). For measuring the latent variables, the observed variables were examined from the literature to measure all latent variables.

The primary data were collected from local resident in Satun province, where the project located. The questionnaires were launched to 310 local residents to measure the perceived impacts of this project by the convenience sampling technique to avoid the bias of sampling selection. The number of samplings was calculated by using the sufficient ratio of estimate parameters and number of sampling in 1:5 [11]. The questionnaire was divided into 4 parts; characteristics of respondents,

the perceived impact question, the supporting of respondents on the project, and the suggestion to improve the project and also project area.

**Table 1.** Measurement Items

Construct	Item	Measurement
ECN	ECN1	Better income distribution
	ECN2	Higher employment
	ECN3	Increasing land value
	ECN4	Increasing foreign direct investment
	ECN5	Better in whole economy
ENV	ENV1	Increasing in air pollution
	ENV2	Increasing in noise pollution
	ENV3	More garbage
	ENV4	Decreasing in marine resource
	ENV5	Worse in whole environment
SOC	SOC1	More safety
	SOC2	Social adaption of local resident
	SOC3	Lack of privacy
	SOC4	Worse in people's health
	SOC5	Worse in whole social and culture
LOG	LOG1	Increasing in alternative of transportation
	LOG2	Smoothly transportation
	LOG3	Better connectivity and business
	LOG4	Improved clean technology in port
	LOG5	Better logistics system and technology
TRS	TRS1	Better the trust of government
	TRS2	Better the trust of local government
	TRS3	Better the trust of ownership of project
	TRS4	Better the trust of whole institution
SUP	SUP1	More emotional support
	SUP2	More appraisal support
	SUP3	More information support
	SUP4	More instrument support (labor/money)

This paper aims to examine the factor affecting support for the Pakbara deep-sea port. For accomplishing the research propose, the Structural Equation Model (SEM) was used to test the model with the sample data. Firstly, the Confirmatory Factor Analysis (CFA) was used to measure the components of each latent variable. Secondly, the path analysis or regression model was calculated to investigate the relationship among all exogenous latent variables (ECN, ENV, SOC, LOG, and TRS) and endogenous variable (SUP). The parameters were estimated by maximum likelihood method.

## 4. Results

### 4.1 Profile of respondents

Respondents of this study were questioned about the demographic characters including: gender, age,

education, and occupation. These demographic characters were shown in Table 2.

**Table 2:** Demographic characteristics of respondents

Variables	Frequency (N=310)	%
<b>Gender</b>		
Male	119	38.39
Female	191	61.61
<b>Age</b>		
< 20 Yr.	10	3.23
21-30	94	30.32
31-40	113	36.45
41-50	63	20.32
51-60	27	8.71
> 60	3	0.97
<b>Education</b>		
Below middle school	39	12.58
Middle school	71	22.90
Vocational education	53	17.10
Bachelor	143	46.13
higher bachelor	4	1.29
<b>Occupation</b>		
freelancer	107	34.52
Agriculturists	54	17.42
Business owner	46	14.84
Officialdom	43	13.87
Employee	39	12.58
Hotel/tour operator	13	4.19
other	8	2.58

The characteristic of respondents in table 2 found that more than half of respondents were female (61.61%), while 38.39 % of them were male. In age, more than 60% were 21-40 years, followed by 41-50 years old (20.32%), 51-60 years old (8.71%). Most of respondents were freelancer (34.52), followed by agriculturists (17.42%), business owner (14.84), officialdom (13.87%), and employee in private company (12.58%).

### 4.2 The Structural Equation Model

For the reliability of this model, the unidimensionality and convergent validity was conducted to test the validity of measurement items. The results found that all of measurement items have been acceptable with  $p$ -value < 0.05. The acceptable items should have the standard all estimation more than twice of standard error. The composite reliability was tested to examine the reliability of observed data. In terms of criterion, the reliability would be acceptable if the Cronbach's alpha is greater than 0.6 [9].

**Table 3:** The composite Reliability test

	Cronbach's Alpha
Economic Impacts	0.925

Environment Impacts	0.944
Social and Cultural Impacts	0.863
Logistics Impacts	0.865
Residents' Support for the project	0.892

In this study, the results of initial Structural equation model (SEM) for Satun residents appeared that although the Confirmatory Factor Analysis (CFA) results were accepted with the Comparative Fit Index (CFI) is 0.950, but other indices were not acceptable; TLI value of 0.941 (<0.950), Root Mean Square Error (RMSEA) value of 0.088 (>0.05). Therefore, the 3 measurement items were eliminated because of their p-value and standard estimation (SOC1, SOC2, and LOG4).

After elimination of 3 items, the whole model was run again and the final revised SEM results interpreted that the model was statistically fitted with the CFI of 0.970, TLI of 0.965, RMSEA of 0.049.

The results from final revised path analysis show that three hypotheses have been accepted (H2, H4, and H5). Specifically, logistics and technology (LOG) has positive relationship with support for the Pak Bara project (standard estimation = 0.298). Institutional trust (TRS) has positive relationship with support for the Pak Bara project (standard estimation = 0.298). Environmental impact (ENV) has negative relationship with support for the Pak Bara project (standard estimation = 0.205). It means that the Satun residents have more concerned about other factors (environment, logistics, and institutional trust) more than economic impact from this project.

Although, the main purpose of this project is for expanding the export of Thailand and get more advantage than Malaka route in Malaysia, the result clearly appeared that residents have not considered about the main objectives of this project like economic aspect that may have affected their life. They tend to concerned more about their changing in daily life whether it be the logistics changing in that area, the environment impact especially marine resources, or their trusts in organization. Accordingly, public hearing of mega-project is a key for understanding the perception of people about the project. Then, the conflict from the residents will be decreased.

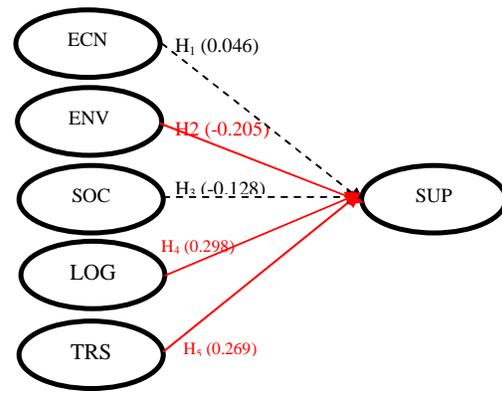


Figure 1. The result of Final revised SEM

### 4.3 Total effect

According to SEM result, there are 3 latent variables have been accepted (ENV, LOG, and TRS). The total effect was calculated to find the measurement items that have effected to the supporting of this project. The result found that the smoothly transportation in the area (LOG2) has the highest effected to the supporting of the project with the positive total effect value of 0.820. It means that Satun resident have more considered that this project can lead the smoothly transportation in that area, then they have more supported. Followed by the trust in project owner (in this case – the marine department) with the positive total effect of 0.790. It means that Satun resident have considered that more trust in the project owner (marine department) can lead more support from them. However, in environment aspect found that more wastes from this project leads to less support from them with the total effect value of -0.727.

Table 3: Total effect of SEM

Item-Construct	Factor loading	Construct loading	Total weight	Mean	Total effect
ENV1-SUP	0.787		-0.161	3.74	-0.603
ENV2-SUP	0.856		-0.175	3.75	-0.658
ENV3-SUP	0.921	-0.205	-0.189	3.85	-0.727
ENV4-SUP	0.889		-0.182	3.86	-0.703
ENV5-SUP	0.903		-0.185	3.86	-0.715
LOG1-SUP	0.680		0.203	3.30	0.669
LOG2-SUP	0.814	0.298	0.243	3.38	0.820
LOG3-SUP	0.802		0.239	3.29	0.786
LOG5-SUP	0.779		0.232	3.29	0.764
TRS1-SUP	0.666		0.179	3.14	0.563
TRS2-SUP	0.831	0.269	0.224	3.22	0.720
TRS3-SUP	0.901		0.242	3.26	0.790
TRS4-SUP	0.851		0.229	3.21	0.735

## 5. Conclusion

The transportation infrastructure is the main key to develop the area especially in economic term. In nowadays, logistics development can generate both

positive economic impact and concern over negative social impact in the area. Such conflict has been discussed widely but still lack of deeper understanding of this situation. This research demonstrates the perception of local residents on the government's logistics project. The paper shows that not only economics or logistics aspect that should be concerned, but also environment and especially the trust in government aspect. In this case, residents more concern about environment, logistics, and trust than economics and social impact.

However, this paper is only focus on people who live in Satun province and do not discussed on other people that might affected from this project as well. For next study, all stakeholders in the area should be considering (e.g., the stakeholder of this project, people in other area) to avoid the bias of perception.

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